Poettker Construction

PARKWAY SCHOOL DISTRICT

BARRETTS ELEMENTARY
BUILDING RENOVATIONS, SITE IMPROVEMENTS AND ABATEMENT

VOLUME TWO: TECHNICAL

ISSUE FOR PERMIT/BID
PROJECT MANUAL
12 NOVEMBER 2026

PARKWAY SCHOOLS

BID NUMBER: 27-27

Owner's Project Number: PN012501B
Architect's Project Number: 26016

bond architects

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St. Louis, MO 63103
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SECTION 000107
SEALS PAGE

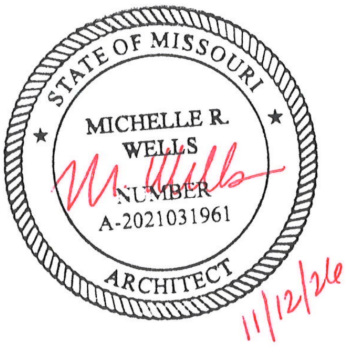
SEALS

1.01 OWNER'S PROJECT NUMBER: PN012501B

1.02 PROJECT TITLE: BRT BUILDING RENOVATIONS AND SITE IMPROVEMENT

1.03 PROJECT LOCATION: BARRETTS ELEMENTARY | 1780 CARMAN ROAD | MANCHESTER, MO 63021

1.04 THE SEALS THAT FOLLOW APPLY TO THE PROJECT MANUAL IN WHICH THIS SEALS PAGE IS BOUND FOR THE PROJECT IDENTIFIED ABOVE.





11/12/2026



11/09/26

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SECTION 024100
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Selective demolition of building elements for alteration purposes excluding removal of hazardous materials and toxic substances.

1.02 RELATED REQUIREMENTS

A. Section 003100 - Available Project Information: Existing building survey conducted by Owner; information about known hazardous materials.

B. Section 011000 - Summary: Limitations on Contractor's use of site and premises.

C. Section 011000 - Summary: Sequencing and staging requirements.

D. Section 011000 - Summary: Description of items to be removed by Owner.

E. Section 011000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.

F. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

G. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

H. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

I. Section 017419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

J. Section 311000 - Site Clearing: Vegetation and existing debris removal; earth stripping and stockpiling.

K. Section 312323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - Safety and Health Regulations for Construction.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with requirements in Section 017000.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Use of explosives is not permitted.
   3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   4. Provide, erect, and maintain temporary barriers and security devices.
   5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.

6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
7. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
8. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

C. Do not begin removal until receipt of notification to proceed from Owner.

D. Do not begin removal until built elements to be salvaged or relocated have been removed.

E. Do not begin removal until vegetation to be relocated has been removed and vegetation to remain has been protected from damage.

F. Protect existing structures and other elements to remain in place and not removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

G. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

H. Provide and maintain daily the effectiveness of dust control walls and required asset protection.

I. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Comply with requirements of Section 017419 - Construction Waste Management and Disposal.
2. Dismantle existing construction and separate materials.
3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

J. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.02 EXISTING UTILITIES

A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Unused underground piping may be abandoned in place provided it is completely drained and capped unless otherwise indicated; remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.03 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
1. Verify construction and utility arrangements are as indicated.
2. Report discrepancies to Architect before disturbing existing installation.
3. Record discrepancies encountered daily on record drawings.

4. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from areas that remain occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings.

C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.

D. Remove existing work as indicated and required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.
   2. Remove items indicated on drawings.

E. Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
   1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. See Section 011000 - Summary for limitations on outages and required notifications.
   4. Verify that abandoned services serve only abandoned facilities before removal.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
   1. Prevent movement of structure. Provide shoring and bracing as required.
   2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch to match new work.

G. Protect items to be salvaged by the Owner or reused in the Work by the Contractor.

3.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site daily as it accumulates. Do not use the Owner's dumpsters.

B. Remove materials not to be reused on site; comply with requirements of Section 017419 - Waste Management.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 028213
REMOVAL OF ASBESTOS CONTAINING MATERIALS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Installation of Critical and Primary Barriers, and Work Area Isolation Procedures are set forth in Section 015643 Temporary Enclosures.

B. Project Decontamination procedures after removal of the Secondary Barrier are specified in Section 017333 Project Decontamination.

C. Disposal of asbestos-containing waste is specified in Section 028233 Disposal of Asbestos Containing Waste Material.

1.02 SUBMITTALS

A. Before the Start of Work: Submit the following to the Owner for review. No work shall begin until these submittals provided:
   1. Surfactant: Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.
   2. Material Safety Data Sheet: Submit the Material Safety Data Sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for each surfactant, encapsulating material and solvent proposed for use on the work. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.
   3. Glovebags: Submit product data.
   4. Mini-Enclosures: Submit sketch of mini-enclosure arrangement to be used.

PART 2 PRODUCTS

2.01 WETTING MATERIALS

A. For wetting prior to disturbance of Asbestos-Containing Materials use amended water:
   1. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the Asbestos-Containing Material and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

2.02 POLYETHYLENE SHEET

A. Polyethylene Sheet: A single polyethylene film in the largest sheet size practicable to minimize seams, 6.0 mil (0.15 mm) thick clear, frosted, or black as indicated.

B. Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films.

2.03 DUCT TAPE

A. Provide duct tape in 2" or 3" widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

2.04 SPRAY CEMENT

A. Provide spray adhesive in aerosol cans which is specifically formulated to stick tenaciously to sheet polyethylene.

2.05 DISPOSAL BAGS

A. Provide 6 mil thick leak-tight polyethylene bags labeled as required by Section 028233 Disposal of Asbestos Containing Waste Material.

2.06 FIBERBOARD DRUMS

A. Provide heavy duty leak tight fiberboard drums with tight sealing locking metal tops.

2.07 PAPER BOARD BOXES

A. Provide heavy duty corrugated paper board boxes coated with plastic or wax to retard deterioration from moisture.

B. Provide in sizes that will easily fit in disposal bags.

2.08 FELT

A. Standard felt approximately 1/16" thick and 36" to 72" in width.

PART 3 EXECUTION

3.01 WORKER PROTECTION

A. Before beginning work with any material for which a Safety Data Sheet has been submitted provide workers with the required protective equipment.

B. Require that appropriate protective equipment be used at all times.

3.02 WET REMOVAL

A. Thoroughly wet to satisfaction of Owner, Asbestos-Containing Materials to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water to penetrate material thoroughly. Spray material repeatedly during the work process to maintain a continuously wet condition. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of amended water or use injection equipment to wet material under the covering. Where necessary, carefully strip away while simultaneously spraying amended water on the installation to minimize dispersal of asbestos fibers into the air.

B. Mist work area continuously with amended water whenever necessary to reduce airborne fiber levels.

C. Remove saturated Asbestos-Containing Material in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Evacuate air from disposal bags with a HEPA filtered vacuum cleaner before sealing. Twist neck of bags, bend over and seal with minimum three wraps of duct tape. Clean outside and move to Wash Down Station adjacent to Material Decontamination Unit.

D. Removal requirements for specific materials: Floor tile and mastic, Full containment

3.03 MINI-ENCLOSURES

A. A Mini-Enclosure consists of a small Work Room with an attached separate Change Room. Worker decontamination requires a remote personnel decontamination unit.

B. Complete requirement of the following:
   1. Section 015733 Worker Protection
   2. Section 015736 Respiratory Protection

C. Sequence of Work: Before beginning work of this sub-section complete the following:
   1. Comply with all applicable OSHA Class I removal procedures, including supervision by a competent person as defined by the regulation, wet removal methods, and use of HEPA filtered vacuums.
   2. Construct a personnel decontamination unit in accordance with Section 015726 Decontamination Units.
   3. Cordon off the work zone within which the mini-enclosure will be installed with barrier tape and post signs at all entrances.
   4. Shut down HVAC system to the general area in which the mini-enclosure will be constructed or otherwise minimize air flow within the area.

D. Work Room: Utilize a prefabricated or construct Work Room in the same manner as a Primary Barrier fabricated from 6 mil sheet plastic. Line walls and floor of the Work Room with a continuous Secondary Barrier.

E. Change Room: Provide an approximately 3'-0" by 3' -0" Change Room attached to Work Room. Fabricate Change Room from 6 mil sheet plastic in the same manner as a Primary Barrier. Locate so that access to Work Area is though Change Room.

F. Step Off Area: Cover floor in front of entry to Change Room with one layer of 6 mil sheet plastic. Securely anchor sheet plastic to prevent slipping.

G. Flapped Door Construction: Provide flapped door as entry to Change Room and entry from Change Room to Work Room. Fabricate each flapped door from overlapping contacting layers of sheet plastic. Fasten each layer on the top and one side. Reinforce free side and bottom of each sheet with duct tape. Alternate sides that are fastened on each layer. Form arrows pointing to entry side from duct tape on inside and outside of door.

H. Signage: At entry to Change Room post an approximately 20 inch by 14 inch manufactured caution sign displaying the following legend with letter sizes and styles of a visibility required by 29 CFR 1926.1101:

I. Entry to Work Room: Require that any time a worker enters the Work Room the following procedure is followed:
   1. Outside of Change Room remove all street clothes and don clean coveralls and respirator. A swim suit or second disposable suite may be worn beneath outer coveralls.
   2. Enter Change Room by sure that entry is completely closed.
   3. Enter Work Room be sure the entry is completely closed.

J. Worker Decontamination: Require that any time a worker leaves the mini-enclosure the following procedure be followed:
   1. Maintain a bucket of clean potable water in the Change Room. Do not amend with a wetting agent.
   2. Do not allow debris in work area to dry or accumulate. HEPA vacuum debris from floor prior to beginning exit procedures.
   3. HEPA vacuum gross debris from disposable suit and foot coverings inside the Work Area. Leave respirator in place.
   4. Proceed with respirator in place to Change Room.
   5. Be sure the entry to Work area is completely closed.
   6. Wash hands, face and surface of respirator with water and wet paper towels. Use caution to avoid breaking seal between respirator face-piece and face.
   7. In Change Room don clean disposable suit leaving respirator in place.
   8. Exit change room, be sure the entry to Change Room is completely closed. Proceed to next Mini-Enclosure, or a remote shower.
   9. At end of work day decontaminate fully in accordance with procedures in section "Worker Protection".

K. Material Decontamination: Require that the following procedure be used in removing equipment and bagged debris from the Work Room:
   1. Worker in Work Room cleans equipment and bagged debris and hands one piece of equipment of one bag of debris at a time to worker in Change Room.
   2. Worker in Change Room wet cleans each piece of equipment or bag. Equipment is sealed completely in 6 mil sheet plastic or bags in the Change Room and passed through the flapped door to the Step Off Area. Bagged waste is placed in a second clean disposal bag and passed to the Step Off Area. Ensure that only one of the two flapped doorways is open at any given time.
   3. Each bag is immediately placed in a sellable cart for transport to the load out area. No bags are to be stored outside of the Mini-Enclosure.
   4. All bag are to be transported through the building in clean sealed containers that have never been in an asbestos Work Area, Mini-Enclosure of decontamination unit.

L. Mini-Enclosure Decontamination: At completion of all Work decontaminate the Work and Changing Rooms as set forth in Section 017333 Project Decontamination.

END OF SECTION

SECTION 028233
DISPOSAL OF ASBESTOS CONTAINING WASTE MATERIALS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Section 014113 Asbestos Abatement Codes, Regulations and Standards - Asbestos Abatement describes applicable federal, state and local regulations.

1.02 DESCRIPTION OF THE WORK

A. This section describes the disposal of Asbestos-Containing Materials. Disposal includes packaging of asbestos-containing waste materials. Disposal may be accomplished either by land filling or converting asbestos containing materials to non-asbestos waste.

1.03 SUBMITTALS

A. Before Start of Work: Submit the following to the Owner for review. Do not start work until these submittals are returned with Owner's approval indicating that the submittal is returned for unrestricted use.
   1. Copy of state or local license for waste hauler.
   2. Name and address of landfill where asbestos-containing waste materials are to be buried. Include contact person and telephone number.

B. Submit copies of all manifests and disposal site receipts to Owner prior to project close-out.

PART 2 PRODUCTS

2.01 DISPOSAL BAGS

2.02 FIRST LABEL:

A. Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard with NESHAP additions:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AVOID CREATING DUST

2.03 SECOND LABEL:

A. Provide in accordance with U. S. Department of Transportation regulation on hazardous waste marking. 49 CFR parts 171 and 172. Hazardous Substances: Final Rule. Published November 21, 1986 and revised October 21, 1991:

RQ ASBESTOS
NA 2212, III

2.04 THIRD LABEL:

A. Affix to asbestos waste containers a label in accordance with National Emission Standard for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61, Subpart M, Section 61.150(a)(1)(v), published November 20, 1990, that includes owners name, address of where asbestos waste was generated, and the name and address of asbestos abatement contractor.

PART 3 EXECUTION

3.01 COMPLY WITH THE FOLLOWING SECTIONS DURING ALL PHASES OF THIS WORK:

A. Section 015733 Worker Protection - Asbestos Abatement

B. Section 015736 Respiratory Protection

3.02 GENERAL

A. All waste is to be hauled by a waste hauler with all required licenses from all state and local authority with jurisdiction.

B. Seal asbestos waste in leak-proof impermeable containers labeled in accordance with Title 29, Code of Federal Regulations, Section 1910.1200 (f).

C. Protect interior of truck or dumpster with Critical and Primary Barriers as described in Section 015643 Temporary Enclosures.

D. Carefully load containerized waste in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material. Vehicle must be placarded with DOT label.

E. Take containers from the Work Area directly to a sealed truck or dumpster.

F. Do not transport disposal bagged materials on open trucks. Double bagged material may be transported on open trucks if they are first loaded in sealed drums. Label drums with same warning labels as bags. Uncontaminated drums may be reused. Treat drums that have been contaminated as asbestos-containing waste and dispose of in accordance with this specification.

G. Advise the landfill operator or processor, in advance of transport, of the quantity of material to be delivered.

H. At disposal site unload containerized waste:
   1. At a disposal site, sealed plastic bags may be carefully unloaded from the truck. If bags are broken or damaged, return to work site for rebagging. Clean entire truck and contents which have been in contact with containerized waste, using procedures set forth in Section 017333 Project Decontamination.
   2. Ensure that no visible emissions are released to the outside air from sealed plastic bags or impermeable containers while transporting or handling at the site where materials and waste are deposited.

I. Retain receipts from landfill or processor for materials disposed of.

J. At completion of project, submit copies of waste manifests to Owner and Owner's Representative.

END OF SECTION

SECTION 028236
REMOVAL OF CLASS II ASBESTOS CONTAINING MATERIALS

PART 1 GENERAL

1.01 APPLICABILITY

A. This section applies to Class II work as defined by OSHA 29 CFR 1926.1101 and means activities involving the removal of asbestos-containing materials (ACM), which is not thermal system insulation (TSI) or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing, siding, shingles, and construction mastics.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Supervision by a competent person is specified in Section 013000 Administrative Requirements.

B. Installation of critical barriers is set forth in Section 015643 Temporary Enclosures.

C. Project decontamination procedures after removal are specified in Section 017333 Project Decontamination.

D. Disposal of asbestos-containing waste is specified in Section 028233 Disposal of Asbestos Containing Waste Material.

1.03 SUBMITTALS

A. Before the Start of Work: Submit the following to the Owner for review. No work shall begin until these submittals provided:
   1. Adhesive Removal Solvent: Submit product data, use instructions and recommendations from manufacturer of adhesive removal solvent intended for use.
   2. Include data substantiating that material complies with requirements.

PART 2 PRODUCTS

2.01 WETTING MATERIALS

A. For wetting prior to disturbance of Asbestos-Containing Materials use amended water:
   1. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the Asbestos-Containing Material and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

2.02 POLYETHYLENE SHEET

A. Provide polyethylene film in the largest size possible to minimize seams, 4 or 6 mil thick as indicated, frosted or black as indicated.

2.03 DUCT TAPE

A. Provide duct tape in 2" or 3" widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.

2.04 SPRAY CEMENT

A. Provide spray adhesive in aerosol cans that is specifically formulated to stick tenaciously to sheet polyethylene.

2.05 DISPOSAL BAGS

2.06 ADHESIVE REMOVAL SOLVENT

A. Provide a slow-drying solvent intended to remove tile adhesive.

B. Provide material that is not flammable, does not create combustible vapors and has no significant inhalation hazard.

PART 3 EXECUTION

3.01 ALL CLASS II WORK

A. Competent Person: All Class II work shall be supervised by a competent person as defined by the regulation.

B. Critical Barriers: Critical barriers shall be placed over all openings to the regulated area or utilize an alternative barrier or isolation method that prevents migration of airborne asbestos from the regulated area and meets the requirements of the regulation.

C. Impermeable Dropcloths: Impermeable dropcloths shall be placed on surfaces beneath all removal activity. Dropcloths shall extend horizontally in all directions one foot for every vertical foot the work surface is above the floor.

D. Comply with the work practices specified for each type of Class II asbestos work being performed as outlined in the following sections.

E. HEPA Filtration: Vacuums, powered saws and other equipment that may generate asbestos fibers shall be equipped with HEPA-filtered exhausts.

F. Wet Methods: Wet methods or wetting agents to control employee exposures shall be employed.

G. OSHA requires the prompt cleanup of wastes and debris and placement in leak-tight containers and labeled with the following information:

H. Establish a decontamination area that is adjacent to the regulated area for decontamination of employees and their equipment. At a minimum the decontamination area shall consist of an airlock chamber and an area covered by an impermeable drop cloth on the floor or horizontal working surface of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination. Work clothes must be cleaned with a HEPA vacuum before clothes are removed. All equipment and surfaces of containers filled with ACM must be cleaned prior to removing them from the equipment room or area. Entry to and exit from the regulated area shall be through the decontamination area.

3.02 VINYL AND ASPHALT FLOORING MATERIALS

A. Before beginning work with any material for which a Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

B. Flooring or its backing shall not be sanded.

C. Vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors.

D. Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during delamination.

E. Rip-up of resilient sheet floor material is prohibited unless performed in a negative pressure enclosure.

F. All scraping of residual adhesive and/or backing shall be performed using wet methods.

G. Dry sweeping is prohibited.

H. Mechanical chipping is prohibited unless performed in a negative pressure enclosure.

I. Tiles shall be removed intact, unless the contractor demonstrates that intact removal is not possible.

J. When tiles can be heated and can be removed intact, wetting may be omitted.

K. Removal of vinyl and asphalt sheet flooring materials shall include all flooring mastics and/or adhesives. Contractor shall only use solvents that have been approved by Owner.

L. Removal of vinyl and asphalt sheet flooring materials shall include all floor fillers and/or leveling compounds.

1. If floor filler and/or leveling material is encountered underneath the flooring materials, the floor filler and/or leveling material shall be removed with the same requirements as the flooring materials and shall be considered a changed condition if the quantity exceeds the assumed amount included in the NTE form.

END OF SECTION

SECTION 028410
HAZARDOUS WASTE MANAGEMENT

PART 1 - GENERAL

1.01 RELATED SECTIONS

A. Section 014113 - Asbestos Abatement Codes, Regulations, and Standards - Asbestos Abatement describes federal, state and local regulations applicable to asbestos.

B. Section 028233 - Disposal of Asbestos Containing Waste Materials describes the handling and disposal of asbestos-containing waste.

1.02 DESCRIPTION OF THE WORK:

A. This section describes the segregation, packaging, labeling, transport, and disposal of non-asbestos containing hazardous waste materials generated by demolition activities and the subsequent shipment of properly packaged and labeled waste materials to an approved disposal site.

1.03 CODES AND REGULATIONS

A. General Applicability of Codes and Regulations: Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable codes and regulations have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.

B. Contractor Responsibility: The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to hazardous waste management and disposal. Hold the Owner and Designer harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of the Contractor, the Contractor's employees, or Subcontractors.

C. Federal Requirements: which govern the management, hauling and disposal of hazardous waste include but are not limited to the following:
   1. DOT: U. S. Department of Transportation, including but not limited to:
      a. Hazardous Substances
         1) Title 49, Part 171 and 172 of the Code of Federal Regulations
      b. Hazardous Material Regulations
         1) General Awareness and Training Requirements for Handlers, Loaders and Drivers
         2) Title 49, Parts 171-180 of the Code of Federal Regulations
      c. Hazardous Material Regulations
         1) Editorial and Technical Revisions
         2) Title 49, Parts 171-180 of the Code of Federal Regulations
   2. EPA: U. S. Environmental Protection Agency (EPA), including but not limited to:
      a. Management of Hazardous Wastes Resource Conservation and Recovery Act (RCRA)
         1) Title 40, Parts 260- 268 of the Code of Federal Regulations

D. State Requirements: Abide by all state requirements which govern the management, hauling and disposal of hazardous waste.

E. Local Requirements: Abide by all local requirements which govern the management, hauling and disposal of hazardous waste.

1.04 DEFINITIONS:

A. Toxicity Characteristic Leaching Procedure (TCLP): A laboratory test method to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes performed in accordance with test methods required under 40 CFR Part 268.

1.05 SUBMITTALS:

A. Before Start of Work: Submit the following to the Owner for review. Do not start work until these submittals are returned with Owner's action stamp indicating that the submittal is returned for unrestricted use.
   1. Copy of state and local licenses for waste hauler.
   2. U.S. EPA Identification Number of waste hauler.
   3. Name and address of waste disposal facility where hazardous waste materials are to be disposed including:
      a. Contact person and telephone number.
      b. Copy of state license and permit.
      c. Disposal facility permits:
   4. Specimen copy of Uniform Hazardous Waste Manifest form.
   5. Copy of EPA Notice of Hazardous Waste activity form
   6. Copy of forms requires by state and local agencies
   7. Sample of disposal label to be used.

B. During Work: Submit the following as required by the work:
   1. TCLP test results, as required to characterize waste for segregation and packaging purposes.
   2. Submit copies of all executed manifests and disposal site receipts to the Owner and/or Owner's Environmental Consultant.

PART 2 - PRODUCTS:

2.01 MATERIALS

A. Disposal Bags: Provide 6 mil thick leak-tight polyethylene bags.

B. DOT Hazardous Waste Disposal Drums: Provide DOT 17-H Open -Top Drums (55 gallon) in accordance with DOT regulations title 49 CFR Parts 173, 178, and 179.

C. DOT Hazardous Waste Labels: in accordance with DOT regulations Title 49 CFR parts 173, 178, and 179.

D. The Owner will provide boxes, drums, etc. for the proper handling, transport and disposal of these items.

PART 3 - EXECUTION

3.01 GENERAL

A. Do not mix potentially hazardous waste streams. Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.

B. Segregate, package, label, transport and dispose of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

3.02 HAZARDOUS WASTE DESIGNATION

A. Where not otherwise designated by the Owner as Hazardous waste, characterize all suspect waste products by conducting representative TCLP testing.

B. Testing of components by use of TCLP will be completed by Owner's Environmental Consultant prior to initiating this project.
   1. A schedule of materials that must be managed as hazardous waste will be coordinated during the pre-construction meeting.

C. Representative sampling of waste products will be in accordance with EPA Document SW 846.

D. TCLP test analysis will be performed in accordance with EPA Method 1311.

3.03 HAZARDOUS WASTE:

A. The following waste products are designated by the Owner as non-salvageable and as Hazardous Waste Types:

1. Waste Type A: PCB waste.
    a. PCB-containing ballasts from fluorescent light fixtures.
2. Waste Type B: Mercury-containing waste.
    a. Individually bagged mercury-containing thermostats.
    b. Fluorescent, and mercury-vapor lamps.

3.04 HAZARDOUS WASTE PACKAGING AND LABELING:

A. Package each segregated hazardous waste Type A and B in specified containers as follows (Important: Do Not mix waste streams):
    1. Waste Type A - Packaging to be provided by Owner
        a. Package in DOT 17-H Open-Top Drums
        b. Fill to capacity only with Waste Type A (Do Not Mix Waste Stream types).
        c. Install gasket on lid, apply lock ring, and seal.
        d. Apply Hazardous Waste Label to drum side.
        e. Enter DOT Shipping Data as follows: RQ Waste Polychlorinated Biphenols, 9, UN-2315, PG-II, (M001).
        f. Adjacent to each label, enter the date indicating when waste was first placed in each drum.
    2. Waste Type B - Packaging to be provided by Owner
        a. Package in DOT 17-H Open-Top Drums with Polyethylene disposal Bag liners
        b. Fill liner bags only with Waste Type B (Do Not Mix Waste Stream types); then neck liner bags down into DOT 17-H Open-Top Drum and seal with duct tape.
        c. Install gasket on lid, apply lock ring, and seal.
        d. Apply Hazardous Waste Label to drum side.
        e. Enter DOT Shipping Data as follows: RQ Hazardous Waste Solid, NOS, 9, NA3077, PG-III, (D009).
        f. Adjacent to each label, enter the date indicating when waste was first placed in each drum.

B. Sealed and Labeled Containers: maintain all containers in a continuously sealed condition after they have been sealed.
    1. Do not reopen sealed containers.
    2. Do not place additional waste in sealed containers.

3.05 TEMPORARY STORAGE:

A. Partially filled containers of hazardous waste may be stored at the work site for intermittent packaging provided that:
    1. Each container is properly labeled when it is first placed in service;
    2. Each container remains closed at all times except when compatible waste types are added; and
    3. When moved from site to site, each container remains within the geographic boundaries of the facility without moving nor crossing public access highways.

3.06 REMOVAL OF HAZARDOUS WASTES:

A. Remove containers of hazardous waste from the work site within seventy-two (72) hours of being filled.
    1. Transporting filled containers from the work site to an approved disposal site or recycling center. Coordinate with Owner prior to transportation to determine the destiny of the wastes.
    2. Continuously maintain custody of all hazardous material generated at the work site including security, short-term storage, transportation and disposition until custody is transferred to an approved disposal site or recycling center. Document continuous chain-of custody.

3. Do not remove, or cause to be removed, hazardous waste from Owner's property without a legally executed Uniform Hazardous Waste manifest, which will be provided by the Owner.
4. At completion of hauling and disposal of each load, submit copy of waste manifest, chain of custody form, and landfill receipt to Owner.

3.07 RECYCLING AND RECOVERY:

A. Turn over waste which contains materials for which recovery and/or recycling is possible to an approved recycling center. Materials subject to recycling include:
1. Fluorescent light tubes.
2. Thermostats with mercury switches.
3. Lead acid batteries
4. Combustible lead-based painted building components and lead-based paint chips.

3.08 BACKCHARGES:

A. Where Contractor fails to fulfill packaging, handling, transport or disposal requirements as outlined herein, Owner may charge back to the Contractor all costs associated with insuring that hazardous wastes are segregated, packaged, transported and disposed of in accordance with all applicable Federal and State regulations.

B. Environmental pollution of Owner's property or other environments resulting from Contractor's hazardous waste management activities may be promptly remediated under Owner's direction, to the Owner's sole satisfaction, and at the Contractor's sole expense.

C. Contractor agrees to either reimburse the Owner or reduce the Contract amount by change order to cover all costs associated with waste re-packaging, waste re-segregation, or pollution remediation efforts.

3.09 REMOVAL OF NON-HAZARDOUS WASTE MATERIALS:

A. Transport and legally dispose of non-hazardous waste products, materials, residues and refuse at a location not on Owner's property.

B. Non-hazardous waste products, materials, residues and refuse include, but are not necessarily limited to:
1. Materials which are determined to be non-hazardous wastes through objective sampling in accordance with EPA Document SW-846 and laboratory analysis in accordance with EPA Method 1311.
2. Personnel protective clothing and safety equipment with de minimis or trace contamination, as determined by visual inspection by Owner's Environmental Consultant.

C. Keep premises in a clean and orderly condition during performance of abatement work.

D. Place non-hazardous construction debris wastes on a daily basis in secure containers for local landfill disposal.

END OF SECTION

SECTION 030100
MAINTENANCE OF CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cleaning of existing concrete surfaces.

B. Repair of exposed structural, shrinkage, and settlement cracks.

C. Scope of Work: As indicated on drawings.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.

1.03 REFERENCE STANDARDS

A. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

B. ASTM C150/C150M - Standard Specification for Portland Cement.

C. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.

D. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate product standards, physical and chemical characteristics, technical specifications, limitations, maintenance instructions, and general recommendations regarding each material.

C. Shop Drawings for Applied Composite Repairs: Provide shop drawings signed and sealed by Professional Engineer indicating:
   1. Repair location.
   2. Repair details.
   3. Fiber type, dimensions, number, thickness, and direction of layers.
   4. Installation sequence.
   5. Splice details.
   6. Joint and end details.
   7. Anchorage.
   8. Connections.

D. Project Record Documents: Accurately record actual locations of structural reinforcement repairs and type of repair.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Cleaner Qualifications: Company specializing in, and with minimum of 3 years of experience in, the type of cleaning specified.

C. Installer Qualifications: Company specializing in performing work of the type specified and with minimum of 3 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturers' instructions for storage, shelf life limitations, and handling of products.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS

A. Degreaser:
   1. Manufacturers:
      a. LATICRETE International, Inc; CITREX: www.laticrete.com/#sle.
      b. SpecChem, LLC; Orange Peel-Citrus Cleaner: www.specchemllc.com/#sle.
      c. W. R. Meadows, Inc: www.wrmeadows.com/#sle.
      d. Substitutions: See Section 016000 - Product Requirements.

B. Detergent: Non-ionic detergent.

2.02 CEMENTITIOUS PATCHING AND REPAIR MATERIALS

A. Finish: Repairs, cleanings, etc. materials shall be reviewed for the need for finish. Finish of new or repaired work shall match the color of adjoining concrete.

B. Manufacturers:
   1. Adhesives Technology Corporation: www.atcepoxy.com/#sle.
   2. ARDEX Engineered Cements: www.ardexamericas.com/#sle.
   3. Dayton Superior Corporation: www.daytonsuperior.com/#sle.
   4. Kaufman Products Inc: www.kaufmanproducts.net/#sle.
   5. The QUIKRETE Companies: www.quikrete.com/#sle.
   6. SpecChem, LLC: www.specchemllc.com/#sle.
   7. Stauf USA LLC: www.staufusa.com/#sle.
   8. W. R. Meadows, Inc: www.wrmeadows.com/#sle.
   9. Substitutions: See Section 016000 - Product Requirements.

2.03 EPOXY PATCHING AND REPAIR MATERIALS

A. Manufacturers:
   1. Dayton Superior Corporation: www.daytonsuperior.com/#sle.
   2. Kaufman Products Inc.: www.kaufmanproducts.net/#sle.
   3. SpecChem, LLC: www.specchemllc.com/#sle.
   4. Sto Corp: www.stocorp.com/#sle.
   5. W. R. Meadows, Inc: www.wrmeadows.com/#sle.
   6. Substitutions: See Section 016000 - Product Requirements.

B. Epoxy Injection Adhesive:
   1. Manufacturers:
      a. Dayton Superior Corporation: www.daytonsuperior.com/#sle.
      b. Kaufman Products Inc; SurePoxy HM, SurePoxy HMLV, SurePoxy HMLV Class B, or SurePoxy HMSLV: www.kaufmanproducts.net/#sle.
      c. SpecChem, LLC; SpecPoxy 1000; www.specchemllc.com/#sle.
      d. W. R. Meadows, Inc; Rezi-Weld LV, Rezi-Weld LV State, Rezi-Weld (IP), or Rezi-Weld Gel Paste: www.wrmeadows.com/#sle.
      e. Substitutions: See Section 016000 - Product Requirements.

2.04 ACCESSORIES

A. Anchoring Adhesive: Self-leveling or non-sag as applicable.

B. Portland Cement: ASTM C150/C150M, Type I, grey.

C. Sand: ASTM C33/C33M or ASTM C404; uniformly graded, clean.

D. Water: Clean and potable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means acceptance of substrate.

3.02 PREPARATION

A. Prepare concrete surfaces to be repaired according to ICRI 310.2R.

3.03 CLEANING EXISTING CONCRETE

A. Provide enclosures, barricades, and other temporary construction as required to protect adjacent work from damage.

B. Clean concrete surfaces of dirt or other contamination using the gentlest method that is effective.
   1. Try the gentlest method first, then, if not clean enough, use a less gentle method taking care to watch for impending damage.
   2. Clean out cracks and voids using same methods.

C. The following are acceptable cleaning methods, in order from gentlest to less gentle:
   1. Water washing using low-pressure, maximum of 100 psi, and, if necessary, brushes with natural or synthetic bristles.
   2. Increasing the water washing pressure to maximum of 400 psi.
   3. Adding detergent to washing water; with final water rinse to remove residual detergent.
   4. Steam-generated low-pressure hot-water washing.

3.04 CRACK REPAIR USING EPOXY ADHESIVE INJECTION

A. Repair exposed cracks.

B. Provide temporary entry ports spaced to accomplish movement of fluids between ports; no deeper than the depth of the crack to be filled or port size diameter no greater than the thickness of the crack. Provide temporary seal at concrete surface to prevent leakage of adhesive.

C. Inject adhesive into ports under pressure using equipment appropriate for particular application.

D. Begin injection at lower entry port and continue until adhesive appears in adjacent entry port. Continue from port to port until entire crack is filled.

E. Remove temporary seal and excess adhesive.

F. Clean surfaces adjacent to repair and blend finish.

END OF SECTION

SECTION 031000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 032000 - Concrete Reinforcing.

B. Section 033000 - Cast-in-Place Concrete.

C. Section 051200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code for Structural Concrete—Code Requirements and Commentary.

B. ACI PRC-347 - Guide to Formwork for Concrete.

C. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials and Commentary.

D. ACI SPEC-301 - Specifications for Concrete Construction.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

C. Design Data: As required by authorities having jurisdiction.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Design formwork under direct supervision of a Professional Structural Engineer experienced in design of concrete formwork and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Chamfer outside corners of beams, joists, columns, and walls.

D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

E. Comply with relevant portions of ACI CODE-318, ACI PRC-347, and ACI SPEC-301.

2.02 WOOD FORM MATERIALS

A. Application: Use for edge forms and unexposed finish concrete only.

B. Form Materials: At the discretion of the Contractor.

2.03 REMOVABLE PREFABRICATED FORMS

2.04 FORMWORK ACCESSORIES

A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.

B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
   1. Do not use materials containing diesel oil or petroleum-based compounds.
   2. Products:
      a. SpecChem, LLC; Bio Strip WB (water-based): www.specchemllc.com/#sle.
      b. Substitutions: See Section 016000 - Product Requirements.

C. Flashing Reglets: Galvanized steel, at least 22 gage, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

E. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 051200.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth forms are not permitted unless specifically indicated on drawings.

B. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members that are not indicated on drawings.

F. Coordinate this section with other sections of work that require attachment of components to formwork.

G. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

G. Form Anchors and Hangers:
   1. Do not use anchors and hangers in exposed concrete leaving exposed metal at concrete surface.
   2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
   3. Penetration of structural steel members is not permitted.

3.06 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.
   1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
   2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI SPEC-117, unless otherwise indicated.

B. Camber slabs and beams in accordance with ACI SPEC-301.

3.08 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.09 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 032000
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ACI MNL-66 - ACI Detailing Manual.

B. ACI SPEC-301 - Specifications for Concrete Construction.

C. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.

D. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI MNL-66 Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
   1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the State in which the Project is located.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: Deformed bars, ASTM A996/A996M Grade 40 (280), Type A.
   1. Galvanized in accordance with ASTM A767/A767M, Class I.

B. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
   1. Form: Flat Sheets.
   2. WWR Style: As indicated on drawings.

C. Reinforcement Accessories:
   1. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   2. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

A. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Accommodate placement of formed openings.

C. Maintain concrete cover around reinforcing as follows:
   1. Walls (exposed to weather or backfill): 1 inch
   2. Footings and Concrete Formed Against Earth: 3 inches
   3. Slabs on Fill: 1 inch

D. Comply with applicable code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 014000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION

SECTION 033000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Floors and slabs on grade.

B. Concrete foundation walls.

C. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 031000 - Concrete Forming and Accessories: Forms and accessories for formwork.

B. Section 032000 - Concrete Reinforcing.

C. Section 079200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

D. Section 321313 - Concrete Paving: Sidewalks, curbs and gutters.

1.03 REFERENCE STANDARDS

A. ACI CODE-318 - Building Code for Structural Concrete—Code Requirements and Commentary.

B. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide.

C. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction.

D. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

E. ACI PRC-305 - Guide to Hot Weather Concreting.

F. ACI PRC-306 - Guide to Cold Weather Concreting.

G. ACI PRC-308 - Curing of Concrete—Guide.

H. ACI SPEC-301 - Specifications for Concrete Construction.

I. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

K. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

L. ASTM C143/C143M - Standard Test Method for Slump of Concrete.

M. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI SPEC-301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI CODE-318, Chapter 5 - Concrete Quality, Mixing and Placing.

D. Test Reports: Submit report for each test or series of tests specified.

E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.

B. Follow recommendations of ACI PRC-305 when concreting during hot weather.

C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 031000.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 032000.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type IL - Limestone Portland type.
   1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.

2.04 ACCESSORY MATERIALS

2.05 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.

B. Concrete Strength: Establish required average strength for concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

C. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
   2. Water-Cement Ratio: Maximum 45 percent by weight.
   3. Maximum Slump: per drawings
   4. Maximum Aggregate Size: 5/8 inch.

2.06 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with Work of this section.

B. Verify requirements for concrete cover over reinforcement

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

D. Commencement of Work shall indicate acceptance of existing conditions.

3.02 PREPARATION

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI PRC-304.

B. Notify Architect not less than 24 hours prior to commencement of placement operations.

C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

D. Ensure reinforcement will not be disturbed during concrete placement.

E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

3.04 CONCRETE FINISHING

A. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by trowel, brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.

B. Concrete Slabs: Finish to requirements of ACI PRC-302.1 and as follows:
   1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI PRC-302.1; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
   2. Other Surfaces to Be Left Exposed: Trowel as described in ACI PRC-302.1, minimizing burnish marks and other appearance defects.

3.05 CURING AND PROTECTION

A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven days.
   2. High early strength concrete: Not less than four days.

C. Surfaces Not in Contact with Forms:
   1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water-fog spray or saturated burlap.
      a. Spraying: Spray water over floor slab areas and maintain wet.
      b. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
   3. Final Curing: Begin after initial curing but before surface is dry.

3.06 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 50 cubic yards or less of each class of concrete placed.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.07 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.08 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

3.09 SCHEDULE - CONCRETE TYPES AND FINISHES

A. Foundation Walls: 3,000 pounds per square inch 28 day concrete, form finish with honeycomb filled surface.

B. Exposed Portico Structure: 4,000 pounds per square inch 28 day concrete, air entrained, smooth rubbed finish.

END OF SECTION

SECTION 054000
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud interior wall framing.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Wall sheathing.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members.

B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

D. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

E. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

F. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.

G. ICC (IBC) - International Building Code.

H. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.

I. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to metal framing systems, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on cold-formed steel structural members; include material descriptions and base steel thickness.

C. Product Data: For lateral-force resisting systems, provide product data sheets on hold-down, showing compliance with requirements.

D. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Indicate stud and ceiling joist layout.
   2. Describe method for securing studs to tracks and for bolted framing connections.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design framing system under direct supervision of a professional structural engineer experienced in designing this work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Structural Framing:

1. CEMCO: www.cemcosteel.com.
2. Dietrich Metal Framing: www.dietrichindustries.com
3. The Steel Network, Inc: www.SteelNetwork.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Connectors:
1. Same manufacturer as metal framing.
2. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Design Requirements: Design cold-formed framing systems, components and connectors to withstand specified design loads in compliance with ICC (IBC), ASCE 7, AISI S100, and AISI S240.

2.03 MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

2.04 STRUCTURAL FRAMING COMPONENTS

A. Wall Studs and Track Sections: AISI S240; c-shaped studs and u-shaped track sections in stud-matching nominal width and compatible height.
1. Thickness and Depth: Depth as indicated on the drawings; thickness and structural grade as required to meet design criteria.

2.05 SHEATHING

A. Wall Sheathing: See Section 061000 - Rough Carpentry.

2.06 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.

C. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.

D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

F. Water-Resistive Barrier: [As specified in Section 072500].

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify field measurements and adjust installation as required.

3.02 INSTALLATION - GENERAL

A. Install structural members and connections in compliance with ASTM C1007.

3.03 INSTALLATION OF STUDS

A. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.

B. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

C. Install intermediate studs above and below openings to align with wall stud spacing.

D. Provide deflection allowance in stud track, directly below horizontal building framing at non-loadbearing framing.

E. Attach cross studs to studs for attachment of fixtures anchored to walls.

F. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

G. Touch-up field welds and damaged corrosion protected surfaces with primer.

3.04 INSTALLATION OF WALL SHEATHING

A. Wall Sheathing [as specified in Section 061000]: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.

3.05 TOLERANCES

A. Maximum Variation from True Position: 1/4 inch.

B. Maximum Variation of any Member from Plane: 1/4 inch.

END OF SECTION

SECTION 055000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated miscellaneous steel and aluminum items.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. AISC (MAN) <http://www.aisc.org/store/c-2-manuals.aspx> - Steel Construction Manual; 2011.

B. AISC 303 <https://www.aisc.org/publications/> - Code of Standard Practice for Steel Buildings and Bridges; 2016.

C. AAMA 611 - Specification for Anodized Architectural Aluminum.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

H. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.

L. AWS D1.2/D1.2M - Structural Welding Code - Aluminum.

M. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172.

N. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.

O. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172 or certified as AISC Approved Structural Steel Fabricator.

1.05 QUALITY ASSURANCE

A. Design to be under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172 or certified as AISC Approved Structural Steel Fabricator.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Bolts, Nuts, and Washers: ASTM A307, Grade A, galvanized to ASTM A153/A153M where connecting galvanized components.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

G. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

A. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

C. Lintels: As detailed; prime paint finish.

2.05 FINISHES - STEEL

A. Prime Painting: One coat.

B. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

C. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.06 FINISHES - ALUMINUM

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick; light bronze.

2.07 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Obtain approval prior to site cutting or making adjustments not scheduled.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 055213
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall mounted handrails.

B. Stair railings and guardrails.

C. Free-standing railings at steps and ramps.

D. Shop Finishing: Shop Powder Coating

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 099113 - Exterior Painting: Paint finish.

1.03 REFERENCE STANDARDS

A. AAMA 611 - Specification for Anodized Architectural Aluminum.

B. ADA Standards - 2010 ADA Standards for Accessible Design.

C. AISC 207 - Standard for Certification Programs.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

G. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

H. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

I. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel.

K. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172.

L. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1.05 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.

B. Welder Qualifications: Welding processes and welding operators qualified within previous 12 months.

C. Fabricator Qualifications:
   1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 207.

2. A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
3. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.

B. Design Criteria: Design and fabricate railings and anchorage to resist the following loads without failure, damage, or permanent set; loads do not need to applied simultaneously.
1. Lateral Force: 85 lb minimum, at any point, when tested in accordance with ASTM E935.
2. Distributed Load; 50lb/ft minimum, applied in any direction at the top of the handrail, when tested in accordance with ASTM E935.
3. Concentrated Loads on Intermediate Rails: 50 psf, minimum.
4. Concentrated Load: 200 lbs minimum, applied in any direction at any point along the rail system, when tested in accordance with ASTM E935.
5. Handrails: Comply with applicable accessibility requirements of ADA Standards.

C. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.

D. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.

E. Allow for expansion and contraction of members and building movement without damage to connections or members.

F. Dimensions: See drawings for configurations and heights.
1. Top Rails and Wall Rails: see drawings
2. Intermediate Rails: see drawings
3. Posts: see drawings
4. Balusters: see drawings

G. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

H. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.

B. Steel Pipe: ASTM A 53/A 53M Grade B Schedule 40, black finish.

C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

D. Galvanizing: In accordance with requirements of ASTM A123/A123M.
1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.

2.03 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:
   1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
   2. Interior Components: Continuously seal joined pieces by continuous welds.
   3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Weld connections that cannot be shop welded due to size limitations.
   1. Weld in accordance with AWS D1.1/D1.1M.
   2. Match shop welding and bolting.
   3. Clean welds, bolted connections, and abraded areas.
   4. Touch up shop primer and factory-applied finishes.
   5. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.

F. Provide returns at ends of handrails. Close ends of returns.

G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
   1. At brackets and fittings fastened to plaster or gypsum board: provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

H. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.04 SHOP FINISHNG

A. Remove tool and die marks and stretch lines, or blend into finish.

B. Shop Powder Coating:
   1. Shop applied TGIC Polyester Coating.
   2. Manufacturers:
      a. Cardinal Industrial Finishes; Polyester TGIC Powder Coating; www.cardinalpaint.com
      b. Substitutions: See Section 016000 - Product Requirements

2.05 ALUMINUM FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick.

B. Color: As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Install railings in compliance with ADA Standards for accessible design at applicable locations.

D. Anchor railings securely to structure.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

3.05 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer.

END OF SECTION

SECTION 061000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Rough opening framing for doors, windows, and roof openings.

B. Roof-mounted curbs.

C. Roofing nailers.

D. Preservative treated wood materials.

E. Fire retardant treated wood materials.

F. Concealed wood blocking, nailers, and supports.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. AWPA U1 - Use Category System: User Specification for Treated Wood.

D. PS 20 - American Softwood Lumber Standard.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.

C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

1.05 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

PART 3 EXECUTION

2.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

2.02 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to authorities having jurisdiction may be used in lieu of solid wood blocking.

C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

2.03 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at each roof opening except where specifically indicated otherwise; form corners by alternating lapping side members.

C. Provide separation and no direct contact of aluminum flashings and preservative pressure treated roof blocking to avoid potential corrosion using roofing membrane or roofing felts.

2.04 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

2.05 CLEANING

A. Waste Disposal: See Section 017419 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 072100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 DEFINITIONS

A. Mineral Fiber Material Composition: Insulation referred to as mineral fiber block, board, and blanket insulation is composed of fibers from mineral based substances such as rock, slag, or glass and processed from the molten state into fibrous form.
   1. Based on type of insulation substance, the material will be referred to as a mineral fiber when having a rock or slag base, and glass fiber with a glass or silica sand base, also considered a mineral.
   2. Insulation blankets are flexible units consisting of felted, bonded, or unbonded fibers formed into rolls or flat cut pieces referred to as batts; rolls are simply longer versions of batts.
   3. For additional information about mineral fiber and the various classification types, refer to the following reference standards; ASTM C553, ASTM C612, ASTM C665, and ASTM C726.

1.03 REFERENCE STANDARDS

A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

D. ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Test Reports: For insulation products, provide independent laboratory reports and test results showing negative asbestos containing materials content using Polarized Light Microscopy (PLM) test method.

1.05 QUALITY ASSURANCE

1.06 FIELD CONDITIONS

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

2.02 MINERAL FIBER BLANKET INSULATION MATERIALS

A. Mineral Wool Blanket Thermal Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.
   1. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

2.03 ACCESSORIES

A. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.

B. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior wall, roof, and ceiling spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

END OF SECTION

SECTION 072500
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air Barriers: Materials that form a system to stop passage of air through exterior walls and joints around frames of openings in exterior walls.

1.02 RELATED REQUIREMENTS

1.03 DEFINITIONS

A. Weather Barriers: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Test Reports: For air barriers, water resistant barriers and vapor retarders, provide independent laboratory reports and test results showing negative asbestos containing materials content using Polarized Light Microscopy (PLM) test method.

1.05 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories Used for Sealing Water-Resistive Barrier and Adjacent Substrates: As indicated or complying with water-resistive barrier manufacturer's installation instructions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions comply with requirements of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Owner’s Inspection and Testing: Cooperate with Owner’s testing agency.
   1. Allow access to work areas and staging.
   2. Notify Owner’s testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
   3. Do not cover work of this section until testing and inspection is accepted.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 076200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, exterior penetrations, and other items indicated in Schedule.

B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement.

D. CDA A4050 - Copper in Architecture - Handbook.

E. SMACNA (ASMM) - Architectural Sheet Metal Manual.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Maintain one copy of each document on site.

C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal.

2.02 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, minimum 2 inches wide, interlocking with sheet.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

H. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.03 ACCESSORIES

A. Primer Type: Zinc chromate.

B. Protective Backing Paint: Zinc molybdate alkyd.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

3.03 INSTALLATION

A. Insert flashings into reglets to form tight fit; secure in place with plastic wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.

B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

C. Apply plastic cement compound between metal flashings and felt flashings.

D. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

E. Seal metal joints watertight.

F. Counterflash with reglets at masonry. Surface mounted termination bars are not acceptable.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 078400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 REFERENCE STANDARDS

A. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems.

B. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

C. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

D. FM (AG) - FM Approval Guide.

E. ITS (DIR) - Directory of Listed Products.

F. UL (FRD) - Fire Resistance Directory.

1.03 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
   2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
   3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

B. Installer Qualifications: Company specializing in performing the work of this section and:

1.04 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Firestopping Manufacturers:
   1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
   2. A/D Fire Protection Systems Inc: www.adfire.com/#sle.
   3. Hilti, Inc: www.us.hilti.com/#sle.
   4. Nelson FireStop Products: www.nelsonfirestop.com/#sle.
   5. Specified Technologies Inc: www.stifirestop.com/#sle.
   6. Tremco Commercial Sealants & Waterproofing; TREMstop Acrylic: www.tremcosealants.com/#sle.

2.02 MATERIALS

A. Prohibited Materials: Do not use asbestos.

B. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

D. Fire Ratings: Refer to drawings for required systems and ratings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

C. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174 and ASTM E2393.

B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 079200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

1.03 REFERENCE STANDARDS

A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.

B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.

C. ASTM C834 - Standard Specification for Latex Sealants.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

E. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.

F. ASTM C1193 - Standard Guide for Use of Joint Sealants.

G. ASTM C1311 - Standard Specification for Solvent Release Sealants.

H. SWRI (VAL) - SWR Institute Validated Products Directory.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Substrates for which use of primer is required.
   6. Substrates for which laboratory adhesion and/or compatibility testing is required.
   7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
   8. Sample product warranty.
   9. Certification by manufacturer indicating that product complies with specification requirements.
   10. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

F. Test Reports: For joint sealants and backing, provide independent laboratory reports and test results showing negative asbestos containing materials content using Polarized Light Microscopy (PLM) test method.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Executed warranty.

1.05 QUALITY ASSURANCE

A. Maintain one copy of each referenced document covering installation requirements on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

E. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   1. Adhesion Testing: In accordance with ASTM C794.
   2. Compatibility Testing: In accordance with ASTM C1087.
   3. Allow sufficient time for testing to avoid delaying the work.
   4. Deliver sufficient samples to manufacturer for testing.
   5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

F. Field Quality Control Plan:
   1. Visual inspection of entire length of sealant joints.

1.06 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide 2-year manufacturer warranty for installed sealants and accessories that fail to achieve a watertight seal, exhibit loss of adhesion or cohesion, or do not cure. Complete forms in Owner's name and register with manufacturer.

C. Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Nonsag Sealants:
   1. Bostik Inc: www.bostik-us.com.
   2. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
   3. Hilti, Inc: www.us.hilti.com/#sle.
   4. Pecora Corporation: www.pecora.com.
   5. Sherwin-Williams Company: www.sherwin-williams.com.
   6. Sika Corporation: www.usa-sika.com.
   7. W.R. Meadows, Inc: www.wrmeadows.com/sle.
   8. Substitutions: See Section 016000 - Product Requirements.

B. Self-Leveling Sealants:

1. Bostik Inc: www.bostik-us.com.
2. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
3. Pecora Corporation: www.pecora.com.
4. Sherwin-Williams Company: www.sherwin-williams.com.
5. Sika Corporation: www.usa-sika.com.
6. W.R. Meadows, Inc: www.wrmeadows.com/sle.
7. Substitutions: See Section 016000 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to:
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. Other joints indicated below.
   3. Do not seal the following types of joints:
      a. Intentional weep holes in masonry.
      b. Joints indicated to be treated with manufactured expansion joint cover, or some other type of sealing device.
      c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      d. Joints where installation of sealant is specified in another section.
      e. Joints between suspended panel ceilings/grid and walls.

B. Exterior Joints: Use nonsag polyurethane sealant, unless otherwise indicated.
   1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, noncuring.
   2. Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.

C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
   1. Wall and Ceiling Joints in Nonwet Areas: Acrylic emulsion latex sealant.
   2. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.

D. Interior Wet Areas: Boiler room; fixtures in wet areas include plumbing fixtures and other similar items.

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with acceptable levels of volatile organic compound (VOC) content; see Section 016116.

2.04 NONSAG JOINT SEALANTS

A. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
   1. Color: White.

B. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 50 percent, minimum.

2. Color: Match adjacent finished surfaces.

C. Nonsag Traffic-Grade Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.
   3. Color: To be selected by Architect from manufacturer's full range.
   4. Service Temperature Range: Minus 40 to 180 degrees F.

D. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, nonstaining, nonbleeding, nonsagging; not intended for exterior use.
   1. Color: To be selected by Architect from manufacturer's full range.
   2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).

E. Noncuring Butyl Sealant: Solvent-based, single component, nonsag, nonskinning, nonhardening, nonbleeding; non-vapor permeable; intended for fully concealed applications.

2.05 SELF-LEVELING JOINT SEALANTS

A. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
   1. Movement Capability: Plus and minus 25 percent, minimum.
   2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
   3. Color: To be selected by Architect from manufacturer's standard range.
   4. Service Temperature Range: Minus 40 to 180 degrees F.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
   1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
   2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
   3. Record each test on Preinstallation Adhesion Test Log as indicated.
   4. If any sample fails, review products and installation procedures, consult manufacturer, or take other measures that are necessary to ensure adhesion; retest in a different location; if unable to obtain satisfactory adhesion, report to Architect.
   5. After completion of tests, remove remaining sample material and prepare joints for new sealant installation.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Provide joint sealant installations complying with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.

D. Install bond breaker backing tape where backer rod cannot be used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

B. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

C. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 POST-OCCUPANCY

A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

END OF SECTION

SECTION 080671
DOOR HARDWARE SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule of door hardware sets for swinging as indicated on drawings.

1.02 RELATED REQUIREMENTS

A. Section 087100 - Door Hardware: Requirements to comply with in coordination with this section.

1.03 REFERENCE STANDARDS

A. BHMA (CPD) - Certified Products Directory.

B. BHMA A156.3 - Exit Devices.

C. BHMA A156.5 - Cylinders and Input Devices for Locks.

D. BHMA A156.13 - Mortise Locks and Latches.

E. BHMA A156.18 - Standard for Materials and Finishes.

F. DHI (H&S) - Sequence and Format for the Hardware Schedule.

1.04 PROJECT INFORMATION

A. Project Name: BRT Building Renovation, Site Improvements and Abatement.
   1. Location: Various Locations District Wide

B. Architect: Bond Architects, Inc
   1. Phone Number: 314-863-4994

C. Contractor: To Be Determined.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Comply with submittal requirements as indicated in Section 087100.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Only manufacturers listed in Section 087100 are considered acceptable.

B. Obtain each type of door hardware as indicated from a single manufacturer and single supplier.

C. Products are listed and certified compliant with specified standards by BHMA (CPD).

D. Manufacturer's Abbreviations: Coordinate with manufacturers listed in Section 087100.
   1. BAS - Best Access Systems.
   2. HGR - Hager.
   3. HES - HES.
   4. IVE - Ives.
   5. LCN - LCN.
   6. McK - McKinney.
   7. NGP - National Guard Products.
   8. PEM - Pemko.
   9. RIX - Rixson.
   10. ROC - Rockwood.
   11. SA - Sargent.
   12. SCH - Schlage.
   13. VD - Von Duprin.

2.02 LOCK FUNCTION CODES

A. Function Codes for Cylindrical Locks: Complying with BHMA A156.5.

B. Function Codes for Mortise Locks: Complying with BHMA A156.13.

C. Function Codes for Exit Devices: Complying with BHMA A156.3.

2.03 FINISHES

A. Finishes: Complying with BHMA A156.18.

1. Code 626: Satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D).

PART 3 EXECUTION

3.01 DOOR HARDWARE SCHEDULE

A. Organize listing of door hardware components within each hardware set in compliance with 10-Part scheduling sequence indicated in DHI (H&S), unless otherwise indicated.

3.02 HARDWARE SET # 2: "EXTERIOR DOORS"

A. For use on Door Number(s): EXD-CIWA, EXD-CIWB AND ALTERNATE #1 EXD-CIA, EXD-CIB.

B. Provide for each Single (SGL) door(s).

UNITS	LOCK	ITEM	DESCRIPTION	FINISH	MFR
3 ea		HINGE, 4 1/2, STD WT	TA2714 4-1/2 X 4-1/2 NRP	26D	MCK
1 ea		RIM EXIT DEVICE	LD-99EO X 299 X 3-0	US26D	VON
1 ea		CLOSER	4040XP.RWPA.689.TBSRT	689	LCN
1 ea		THRESHOLD	412S X 36	MIL	HAG
1 ea		DRIP CAP	810S X 40	MIL	HAG

3.03 HARDWARE SET # 1: "HOLLOW METAL FRAMES"

A. For use on Door Number(s): [EXD-210].

B. Provide for each PAIR (PR) door(s).

UNITS	LOCK	ITEM	DESCRIPTION	FINISH	MFR
6ea		HINGE, 4 1/2, STD WT	BB1279 4-1/2 X 4-1/2 NRP	26D	MCK
1 ea		MULLION	KR4954 X 7-2	SP28	VON
2 ea		RIM EXIT DEVICE	LD-99EO X 299 X 3-0	US26D	VON
1 ea		RIM EXIT DEVICE	LD-99L-NL-299 X 3-0	US 26D	VON
1 ea		RIM CYLINDER	12E-7-2-S2-RP X L/C		
1 ea		MORTISE CYLINDER	1E-7-4-C4-RP3 X L/C	626	BES
2 ea		CLOSER	4040XP.SCUSH.689	689	LCN
1 ea		WEATHER STRIPPING	8780N-BK 8’ PSA	BK	ZER
1 ea		THRESHOLD	412S X 72	MIL	HAG
1 ea		DRIP CAP	810S X 82	MIL	HAG

END OF SECTION

SECTION 081613
FIBERGLASS DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiberglass reinforced polyester (FRP) doors.

B. Frames for fiberglass reinforced polyester (FRP) doors.

C. Fiberglass reinforced polyester (FRP) Architectural Panels.

D. Hinges.

E. Glazing.

1.02 RELATED REQUIREMENTS

A. Section 087100 - Door Hardware: Door hardware.

1.03 REFERENCE STANDARDS

A. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.

B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

C. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.

D. ASTM B 221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. ASTM D 256 - Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.

F. ASTM D 570 - Water Absorption of Plastics.

G. ASTM D 638 - Tensile Properties of Plastics.

H. ASTM D 790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

I. ASTM D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

J. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.

K. ASTM D 1623 - Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

M. ICC (IBC) - International Building Code.

N. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Obtain hardware templates from hardware manufacturer prior to starting fabrication.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturer's standard details, installation instructions, and hardware and anchor recommendations.

C. Shop Drawings: Unique to this project to avoid resubmittal. Show layout, dimensions and profiles; include assembly methods.

1. Indicate product components, including hardware reinforcement locations and preparations, accessories, finish colors, patterns, and textures.

D. Selection Samples: Submit two complete sets of color chips, illustrating manufacturer's available finishes, colors, and textures.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer; include detailed terms of warranty.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Mark doors with location of installation, door type, color, and weight.

B. Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

C. Store materials in original packaging, under cover, protected from exposure to harmful weather conditions and from direct contact with water.
   1. Store at temperature and humidity conditions recommended by manufacturer.
   2. Do not use non-vented plastic or canvas shelters.
   3. Immediately remove wet wrappers.

D. Store in position recommended by manufacturer, elevated minimum 4 inches above grade, with minimum 1/4 inch space between doors.

1.08 FIELD CONDITIONS

A. Do not install doors until structure is enclosed.

B. Maintain temperature and humidity at manufacturer's recommended levels during and after installation of doors.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide ten (10) year manufacturer warranty covering materials and workmanship , including degradation or failure due to chemical contact.

C. Provide Ten (10) year application warranty on all factory installed hardware.

D. Lifetime warranty on delamination or bubbling of door skin.

E. Lifetime warranty on corner joinery and core deterioration.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fiberglass Doors:
   1. Special - Lite Inc.: Model SL-17, www.special-lite.com.
   2. Substitutions: Not permitted

2.02 PRODUCT DESCRIPTION:

A. Exterior entry doors constructed of extruded aluminum frame members, fiberglass reinforced polyester face sheets and foam insulation core

B. Transom Panels: To match door, or as indicated on Drawings

C. Side Lites: match door, or as indicated on Drawings.

2.03 PERFORMANCE REQUIREMENTS

A. General: Provide door assemblies that have been designed and fabricated to comply with specified performance requirements, as demonstrated by testing manufacturer's corresponding standard systems.

B. Air Infiltration: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 283 at pressure differential of 6.27 psf. Door shall not exceed 0.58 cfm/sf.

C. Water Resistance: For a single door 3'-0" x 7'-0", test specimen shall be tested in accordance with ASTM E 331 at pressure differential of 7.50 psf. Door shall not have water leakage.

D. Indoor air quality testing per ASTM D 6670-01: GREENGUARD Environmental Institute Certified including GREENGUARD for Children and Schools Certification.

E. Thermal Transmission, Exterior Doors, U-Value, AAMA 1503-98: Maximum of 0.29 BTU/hr x sf x degrees F.

F. Surface Burning Characteristics, FRP Doors and Panels, ASTM E 84:
   1. Flame Spread: Maximum of 200, Class C.
   2. Smoke Developed: Maximum of 450, Class C.

G. Surface Burning Characteristics, Class A Option On Interior Faces of FRP Exterior Panels and Both Faces of FRP Interior Panels, ASTM E 84:
   1. Flame Spread: Maximum of 25.
   2. Smoke Developed: Maximum of 450.

H. Forced Entry Test, Single Door:
   1. Uniform Static Load, ASTM E 330: Plus or Minus 195 pounds per square foot.
   2. Forced Entry Test, 300 Pound Load Applied, SFBC 3603.2 (b)(5): Passed.

I. Forced Entry Test, Double Doors:
   1. Uniform Static Load, ASTM E 330: Plus or Minus 112.5 pounds per square foot.
   2. Forced Entry Test, 300 Pound Load Applied, AAMA 1304: Passed.

J. Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 256: 14.0 foot-pounds per inch of notch.

K. Tensile Strength, FRP Doors and Panels, Nominal Value, ASTM D 638: 12,000 psi.

L. Flexural Strength, FRP Doors and Panels, Nominal Value, ASTM D 790: 21,000 psi.

M. Water Absorption, FRP Doors and Panels, Nominal Value, ASTM D 570: 0.20 percent after 24 hours.

N. Indentation Hardness, FRP Doors and Panels, Nominal Value, ASTM D 2583: 55.

O. Gardner Impact Strength, FRP Doors and Panels, Nominal Value, ASTM D 5420: 120 in-lb.

P. Abrasion Resistance, Face Sheet, Taber Abrasion Test, 25 Cycles at 1,000 Gram Weight with CS-17 Wheel: Maximum of 0.029 average weight loss percentage.

Q. Stain Resistance, ASTM D 1308: Face sheet unaffected after exposure to red cabbage, tea, and tomato acid. Stain removed easily with mild abrasive or FRP cleaner when exposed to Sharpie ink pen and white spray paint.

R. Compressive Strength, Foam Core, Nominal Value, ASTM D 1621: 79.9 psi.

S. Compressive Modulus, Foam Core, Nominal Value, ASTM D 1621: 370 psi.

T. Tensile Adhesion, Foam Core, Nominal Value, ASTM D 1623: 45.3 psi.

2.04 FIBER REINFORCED POLYESTER DOOR COMPONENTS

A. Door Construction:
   1. Thickness: 1-3/4 inches.
   2. Stiles and Rails: Aluminum Alloy 6063-T6, minimum of 2-5/16-inch depth, corners mitered or mortise & tenon.
   3. Top rail: Aluminum Alloy 6063-T5, minimum of 6-inch depth

4. Provide joinery of 3/8-inch diameter full-width tie rods through extruded splines top and bottom as standard tubular shaped stiles and rails reinforced to accept hardware as specified or Mortise and Tenon on all four joints secured with 3/8" diameter full width tie rods one at Head rail and one at bottom rail.

B. Face Sheet:
   1. Material: SpecLite3, 0.120-inch thickness, finish color throughout. Abuse-resistant engineered surface.
   2. Texture: Pebble Grain.
   3. Color: As selected by the Architect from manufacturer's full range of color selections. Exposed colors shall be fade/ chalking resistant for full term of warranty

C. Core:
   1. Material: Polyurethane foam.
   2. Density: Minimum of 5 pounds per cubic foot.
   3. R-Value: Minimum of 11.

D. Hardware:
   1. Premachine doors in accordance with templates from specified hardware manufacturers and hardware schedule.
   2. Factory installed hardware (see warranty requirements).
   3. Reinforce for scheduled hardware.
   4. Adjustable astragal on stile.
   5. Concealed Adjustable Bottom Brush.

2.05 MATERIALS

A. Aluminum Members:
   1. Extrusions: ASTM B 221.
   2. Sheet and Plate: ASTM B 209.
   3. Alloy and Temper: As required by manufacturer for strength, corrosion resistance, application of required finish, and control of color.
   4. Exposed colors shall be fade/ chalking resistant for full term of warranty.

B. Components: Door and frame components from same manufacturer.

C. Fasteners:
   1. Material: Aluminum, 18-8 stainless steel, or other noncorrosive metal.
   2. Compatibility: Compatible with items to be fastened.
   3. Exposed Fasteners: Screws with finish matching items to be fastened.

2.06 FABRICATION

A. Sizes and Profiles: Required sizes for door and frame units, and profile requirements shall be as indicated on the Drawings

B. Coordination of Fabrication: Field measure before fabrication and show field recorded measurements on shop drawings.

C. Assembly:
   1. Complete cutting, fitting, forming, drilling, and grinding of metal before assembly.
   2. Remove burrs from cut edges.

D. Fit:
   1. Maintain continuity of line and accurate relation of planes and angles.
   2. Secure attachments and support at mechanical joints with hairline fit at contacting members.

2.07 ARCHITECTURAL PANELS

A. Face Sheets:
   1. Material: FRP, 0.120-inch thickness, finish color throughout. Abuse-resistant engineered surface.

2. Texture: Pebble
3. Color: To be selected by Owner. Exposed colors shall be fade/ chalking resistant for full term of warranty
4. Insulated FRP Panels:
    a. Panel thickness: Same as adjacent doors.
    b. Face sheets: FRP, 0.120-inch minimum thickness.
    c. Core: Foamed polyurethane core of a minimum of 5 pounds per cubic foot density.
    d. Form components to function as single unit.
    e. U-Value: Minimum of 0.18 for 1-inch panels.
5. Class A Flame Spread and Smoke Developed Rating:
    a. Class A flame spread and smoke developed rating on interior faces of exterior panels and both faces of interior panels.
    b. Flame Spread, ASTM E 84: Maximum of 25.
    c. Smoke Developed, ASTM E 84: Maximum of 450.

2.08 ALUMINUM FINISHES

A. Anodized Finish: Class I finish, 0.7 mils thick.
    1. Color: Dark Bronze, AA-M10C12C22A44 as scheduled.

2.09 DOOR AND FRAME ASSEMBLIES

A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
    1. Operation: Manual.
    2. Operation: Power operator.
    3. Door and frame pre-assembled, complete with hinges; shipped with braces, spreaders, and packaging as required to prevent damage. Color to match exposed styles and rails.
        a. Door is to be complete with factory installed hinges:
            1) Manufacturers - Heavey Duty Butt Hinges:
                (a) Hager, BB1191
                    (1) Provide power transfer hinges where electrified hardware is mounted in door leaf.
                (b) Substitutions: Not Permitted
    4. Physical Endurance: Swinging door cycle test to ANSI/SDI A250.4, Level A (1,000,000 cycles) minimum; tested with hardware and fasteners intended for use on project.
    5. Screw-Holding Capacity: Tested to 890 pounds, minimum.
    6. Surface Burning Characteristics: Flame spread index (FSI) of 0 to 25, Class A, and smoke developed index (SDI) of 450 or less, when tested in accordance with ASTM E84.
    7. Flammability: Self-extinguishing when tested in accordance with ASTM D635.
    8. Sizes: As indicated on drawings.
    9. Clearance Between Door and Frame: 1/8 inch, maximum.
    10. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4 inch clearance to threshold.
    11. Provide frame anchors that allow for variation in rough opening size; allow doors and frames to be field cut up to 2 inch maximum to adjust for field conditions.
    12. Concealed Adjustable Bottom Brush; Model SL-301: Concealed unit with two adjustable nylon bristle brushes to create a weather-tight seal with any style threshold; two adjustment screws at the hinge stile side of the door allowing either side or both sides of the brush insert to be moved from [0.15] inches extended to [0.74] inches fully extended.
    13. Adjustable astragals for Inactive Leaves.

2.10 HARDWARE

A. Door Hardware: See Section 087100 - Door Hardware

2.11 ACCESSORIES

A. Concealed Adjustable Bottom Brush; Model SL-301: Concealed unit with two adjustable nylon bristle brushes to create a weather-tight seal with any style threshold; two adjustment screws at the hinge stile side of the door allowing either side or both sides of the brush insert to be moved from 0.15 inches extended to 0.74 inches fully extended.

B. Glazing Stops: Factory installed with screw-applied aluminum stops anodized to match perimeter door rails; fasteners not penetrating waterproof integrity.
   1. Exterior Doors: Provide non-removable stops on exterior side with continuous compression gasket weatherseal.
   2. Opening Sizes: As indicated on Drawings.

C. Factory Installed Glazing: Laminated safety glass, 1/4 inch thick, with minimum 0.030 inch thick interlayer, tinted low e in 1 inch glass insulating units.

D. Hardware: As specified in Section 087100.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify actual dimensions of openings by field measurements before door fabrication; show recorded measurements on shop drawings.

B. Do not begin installation until substrates have been properly prepared.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding. Proceeding with the work shall indicate acceptance of existing conditions.

3.02 PREPARATION

A. Remove existing doors and frames, and dispose of all removed materials in accordance with local authorities having jurisdiction.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Clean and prepare substrate in accordance with manufacturer's directions.

D. Protect adjacent work and finish surfaces from damage during installation.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions; do not penetrate frames with anchors.

B. Where required, Install fire-rated assemblies in accordance with NFPA 80.

C. Set units plumb, level, and true-to-line, without warping or racking doors, and with specified clearances; anchor in place.

D. Set thresholds in continuous bed of sealant.

E. Separate aluminum and other metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

F. Repair or replace damaged installed products.

G. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

H. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

I. Install thresholds custom cut and designed for this installation and embedded in sealant

3.04 ADJUSTING

A. Lubricate, test, and adjust doors to operate easily, free from warp, twist or distortion, and to fit watertight for entire perimeter.

B. Adjust hardware for smooth and quiet operation.

C. Adjust doors to fit snugly and close without sticking or binding.

D. Adjust automatic door closer for smooth and consistent activation and operation, as well as manual operation when ADA activation is turned off with 15 lbs maximum pressure to operate.

3.05 CLEANING

A. Remove all paper labels.

B. Clean installed products in accordance with manufacturer’s instructions prior to owner’s acceptance.

3.06 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

B. Clean doors [and glazing] promptly after installation in accordance with manufacturer's instructions.

C. Do not use harsh cleaning materials or methods that would damage any finish.

D. Obtain signoff/acknowledgement at punch list from Architect/Engineer that cleaning has been done satisfactorily.

END OF SECTION

SECTION 084313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass. Aluminum storefront with doors to be same as door manufacturer

B. Infill panels of metal and FRP.

C. Aluminum doors and frames.

D. Weatherstripping.

1.02 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.

B. Section 085113 - Aluminum Windows: Operable sash within glazing system.

C. Section 087100 - Door Hardware: Hardware items other than specified in this section.

D. Section 088000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.

B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

C. AAMA 611 - Specification for Anodized Architectural Aluminum.

D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

G. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum-Framed Storefronts:
   1. Special - Lite Inc..

2.02 MANUFACTURERS

A. Aluminum-Framed Storefront and doors:
   1. EFCO Corporation; 403X Series: www.efcocorp.com.
   2. Kawneer North America; 451UT Series: www.kawneer.com.
   3. Manko Window Systems, Inc.; 2450xpt CG Series: www.mankowindows.com.
   4. Oldcastle BuildingEnvelope; 3000 XT Series: www.oldcastlebe.com.
   5. Tubelite, Inc.; TU24000 Series: www.tubeliteinc.com.
   6. Special - Lite Inc.
   7. Substitutions: Not permitted.

2.03 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Glazing Position: Centered (front to back).
   2. Finish: .
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
   3. Finish Color: As selected by Architect from a full range of custom colors .
   4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   7. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   8. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements
   1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
      a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
   2. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.

2.04 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Glazing Stops: Flush.

B. Glazing: See Section 088000.

C. Infill Panels: Insulated FRP, aluminum, with edges formed to fit glazing channel and sealed.
   1. Total Nominal Thickness: 1 inch.
   2. Face Sheet: 1/4 inch thick.
   3. Core: Glass fiber insulation core with R-value of _____.
   4. Back Sheet: 1/4 inch thick.
   5. Finish: Same as storefront.

D. Operable Sash: See Section 085113.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209/B209M.

C. Fasteners: Stainless steel.

D. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.

E. Sealant for Setting Thresholds: Non-curing butyl type.

F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

G. Glazing Accessories: See Section 088000.

2.06 HARDWARE

A. For each door, include weatherstripping and sill sweep strip.

B. Door Hardware: As specified in Section 087100 and Section 081613.

C. Weatherstripping: Wool pile, continuous and replaceable; provide on all exterior doors.

D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all exterior doors.

END OF SECTION

SECTION 085113
ALUMINUM WINDOWS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Extruded aluminum windows with fixed sash and operating sash.

B. Factory glazing.

C. Operating hardware.

D. Insect screens.

1.02 RELATED REQUIREMENTS

A. Section 072500 - Weather Barriers: Sealing frame to water-resistive barrier installed on adjacent construction.

B. Section 088000 - Glazing.

1.03 REFERENCE STANDARDS

A. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

B. AAMA 611 - Specification for Anodized Architectural Aluminum.

C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

D. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.

E. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

H. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Include component dimensions, information on glass and glazing, internal drainage details, and descriptions of hardware and accessories.

C. Shop Drawings: Indicate opening dimensions, elevations of different types, framed opening tolerances, method for achieving air and vapor barrier seal to adjacent construction, anchorage locations, hardware, accessories, and installation requirements.

D. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
   1. Evidence of AAMA Certification.
   2. Evidence of WDMA Certification.
   3. Evidence of CSA Certification.
   4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

E. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of AAMA CW-10.

B. Protect finished surfaces with wrapping paper or strippable coating during installation. Do not use adhesive papers or sprayed coatings that bond to substrate when exposed to sunlight or weather.

1.07 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F.

B. Maintain this minimum temperature during and 24 hours after installation of sealants.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers - Aluminum Windows:
   1. EFCO, a Pella Company; 2700 Series: www.efcocorp.com.
   2. Graham Architectural Products 6500 Series: www.grahamwindow.com
   3. Kawneer 8225TL Series: www.kawneer.com
   4. Manko Window Systems, Inc; 800 Series: www.mankowindows.com.
   5. YKK AP America Inc; YOW 225 TU Series: www.ykkap.com.
   6. Winco Ventilator Co; 1150 Series: www.winco.com
   7. Tubelite; 3700 Series www.tubeliteinc.com.
   8. Oldcastle BuildingEnvelope; Signature Series 12PL; www.obe.com
   9. Substitutions: Not permitted.

2.02 ALUMINUM WINDOWS

A. Aluminum Windows: Extruded aluminum frame and sash, factory fabricated, factory finished, with operating hardware, related flashings, and anchorage and attachment devices.
   1. Frame Depth: 2-1/4 inches.
   2. Operable Units: Double weatherstripped.
   3. Provide factory-glazed units.
   4. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for operating hardware and imposed loads.
   5. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   6. Movement: Accommodate movement between window and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
   7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   8. Thermal Movement: Design to accommodate thermal movement caused by 180 degrees F surface temperature without buckling stress on glass, joint seal failure, damaging loads on structural elements, damaging loads on fasteners, reduction in performance or other detrimental effects.

B. Fixed, Non-Operable Type:

1. Construction: Thermally broken.
2. Glazing: Double; clear; low-e.
3. Exterior Finish: Class I natural anodized.
4. Interior Finish: Class I natural anodized.

C. Outswinging Hopper Type:
1. Construction: Thermally broken.
2. Provide screens.
3. Glazing: Double; clear; low-e.
4. Exterior Finish: Class I natural anodized.
5. Interior Finish: Class I natural anodized.

2.03 PERFORMANCE REQUIREMENTS

A. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
1. Performance Class (PC): CW.
2. Performance Grade (PG): Equivalent to or greater than specified design pressure.

B. Design Pressure (DP): In accordance with applicable codes.

C. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.

D. Condensation Resistance Factor of Frame: 50, measured in accordance with AAMA 1503.

E. Overall Thermal Transmittance (U-value): 0.35, maximum, including glazing, measured on window sizes required for this project.

F. Forced Entry Resistance: Tested to comply with ASTM F588 requirements for performance level of Grade 10 for specific window style required.

2.04 COMPONENTS

A. Frames: 2-1/4 inch wide by 4-1/2 inch deep profile, of 0.125 inch thick section; thermally broken with interior portion of frame insulated from exterior portion; flush glass stops of snap-on type.

B. Sills: 1/8 inch thick, extruded aluminum; sloped for positive wash; fit under sash leg to 1/2 inch beyond wall face; one piece full width of opening; jamb angles to terminate sill end.

C. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable hardware allowing screen removal without use of tools.
1. Hardware: Spring loaded steel pins; four per screen unit.
2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
3. Frame Finish: Same as frame and sash.

D. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to achieve effective weather seal.

E. Fasteners: Stainless steel.

F. Glazing Materials: See Section 088000.

G. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

2.06 HARDWARE

A. Sash lock: Lever handle with cam lock.

B. Operator: Lever action handle fitted to projecting sash arms with limit stops.

C. Projecting Sash Arms: Cadmium plated steel, friction pivot joints with nylon bearings, removable pivot clips for cleaning.

D. Window Opening Control Devices (WOCD): Provide operable window sash hardware that limits openings to only allow passage of 4 inch diameter rigid sphere or less, and are easily releasable to fully open without use of keys, tools, or special knowledge.

E. Pulls: Manufacturer's standard type.

F. Bottom Rollers: Stainless steel, adjustable.

G. Limit Stops: Resilient rubber.

2.07 FINISHES

A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A44, electrolytically deposited colored anodic coating not less than 0.7 mil thick.

B. Finish Color: As selected by Architect from manufacturer's full range.

C. Apply one coat of bituminous coating to concealed aluminum and steel surfaces in contact with dissimilar materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall openings and adjoining water-resistive barrier materials are ready to receive aluminum windows; see Section 072500.

3.02 PRIME WINDOW INSTALLATION

A. Install windows in accordance with manufacturer's instructions.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

D. Install sill and sill end angles.

E. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

F. Install operating hardware not pre-installed by manufacturer.

G. Install glass and infill panels in accordance with requirements; see Section 088000.

3.03 TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.04 ADJUSTING

A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

D. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.

END OF SECTION

SECTION 087100
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for FRP doors.
B. Hardware for fire-rated doors.
C. Electrically operated and controlled hardware.
D. Low Energy Power Automatic Operators
E. Thresholds.
F. Weatherstripping and gasketing.

1.02 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealants for setting exterior door thresholds.
B. Section 080671 - Door Hardware Schedule: Schedule of door hardware sets.
C. Section 081113 - Hollow Metal Doors and Frames.
D. Section 081416 - Flush Wood Doors.
E. Section 081613 - Fiberglass Doors.
F. Section 083490 - Tornado-Resistant Assemblies: Tornado doors for storm shelters
G. Section 271000 - Structured Cabling - Wiring for Access Control homerun to data room
H. Section 284600 - Fire Detection and Alarm: Electrical connection to activate door closers.

1.03 REFERENCE STANDARDS

A. BHMA A156.1 - Standard for Butts and Hinges.
B. BHMA A156.2 - Bored and Preassembled Locks and Latches.
C. BHMA A156.3 - Exit Devices.
D. BHMA A156.4 - Door Closers and Pivots.
E. BHMA A156.5 - Cylinders and Input Devices for Locks.
F. BHMA A156.6 - Standard for Architectural Door Trim.
G. BHMA A156.7 - Template Hinge Dimensions.
H. BHMA A156.8 - Door Controls - Overhead Stops and Holders.
I. BHMA A156.13 - Mortise Locks and Latches.
J. BHMA A156.15 - Release Devices - Closer Holder, Electromagnetic, and Electromechanical.
K. BHMA A156.16 - Standard for Auxiliary Hardware.
L. BHMA A156.17 - Self Closing Hinges & Pivots.
M. BHMA A156.18 - Standard for Materials and Finishes.
N. BHMA A156.21 - Thresholds.
O. BHMA A156.22 - Standard for Gasketing.
P. BHMA A156.26 - Standard for Continuous Hinges.
Q. BHMA A156.30 - Standard for High Security Cylinders.
R. BHMA A156.31 - Electric Strikes and Frame Mounted Actuators.
S. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors.
T. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
U. UL (DIR) - Online Certifications Directory.

V. UL 437 - Standard for Key Locks.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
   1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
   2. Provide complete description for each door listed.

D. Shop Drawings - Electrified Door Hardware: Submit diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
   1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
   2. Elevations: Submit front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
   3. Diagrams: Submit point-to-point wiring diagram that shows each device in door opening system with related colored wire connections to each device.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least five years of documented experience.

1.07 INSPECTION AND TESTING

A. Submit a written report of the results of functional testing and inspection for fire door assemblies, in compliance with NFPA 80.
   1. Written report to be provided to the Owner and be made available to the Authority Having Jurisdiction (AHJ).
   2. Report to include the door number for each fire door assembly, door location, door and frame material, fire rating, and summary of deficiencies.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.09 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.
   1. Closers: Five years, minimum.
   2. Exit Devices: Three years, minimum.
   3. Locksets and Cylinders: Three years, minimum.

4. Other Hardware: Two years, minimum.

PART 2 PRODUCTS

2.01 HINGES

A. Manufacturers:
   1. McKinney; an Assa Abloy Group company: www.assaabloydss.com.
   2. Hager Companies: www.hagerco.com.
   3. Models:
      a. Interior doors 36" wide and less, standard weight steel:
         1) Hager, BB1279.
      b. Swing clear at double egress, heavy weight steel:
         1) Hager, BB1262.
      c. Corrosive area doors 36" wide and less, standard weight stainless steel:
         1) Hager, BB1191.

B. Substitutions: Not permitted.

C. Hinges: Comply with BHMA A156.1, Grade 1.
   1. Self Closing Hinges: Comply with BHMA A156.17.
   2. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
      a. Provide hinge width required to clear surrounding trim.
   3. Continuous Hinges: Comply with BHMA A156.26.
   4. Provide hinges on every swinging door.
   5. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   6. Provide ball-bearing hinges at each door with closer.
   7. Provide non-removable pins on exterior outswinging doors.
   8. Provide power transfer hinges where electrified hardware is mounted in door leaf.
   9. Provide following quantity of butt hinges for each door:
      a. Doors up to 60 inches High: Two hinges.
      b. Doors From 60 inches High up to 90 inches High: Three hinges.
      c. Doors 84 inches High and over: Butt hinges not allowed, use continuous gear type hinge.
      d. Doors 36 inches Wide and over: Butt hinges not allowed, use continuous gear type hinge.

2.02 HINGES, CONTINUOUS GEAR TYPE

A. Manufacturers:
   1. Assa Abloy- McKinney or Pemko: www.assaabloydss.com.
   2. Hager Companies Roton: www.hagerco.com.
   3. Models:
      a. For new frames:
         1) McKinney, MCK-25HD: only use on wired card readers
         2) Roton, 780-224HD
      b. For retrofits to existing frames:
         1) McKinney, MCK-54D: only use on wired card readers
         2) Roton, 780-053HD.
   4. Substitutions: Not permitted.

2.03 FLUSHBOLTS AND COORDINATORS

A. Manufacturers:
   1. Rockwood, an Assa Abloy Group company: www.assaabloydss.com.
   2. Hager Companies: www.hagerco.com.
   3. Ives, an Allegion brand: www.allegion.com/us.
   4. Trimco: www.trimcohardware.com.
   5. Models:

a. Automatic at hollow metal door:
1) Ives, FB31P.
2) Rockwood, 2842.
3) Trimco, 3810.
4) Hager 292D
b. Manual at hollow metal door:
1) Ives, FB358.
2) Rockwood, 550.
3) Trimco, 3917.
4) Hager 282D
6. Substitutions: Not permitted.

B. Flush Bolts: Comply with BHMA A156.16, Grade 1.
1. Flush Bolt Throw: 3/4 inch, minimum.
2. Provides extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.
a. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
3. Provide dustproof floor strike for bolt into floor, except at metal thresholds.
4. Automatic Flush Bolts: Automatically latch upon closing of door; automatic retraction of bolts when active leaf is opened; located on inactive leaf of pair of doors.

2.04 EXIT DEVICES

A. Manufacturers:
1. Von Duprin, an Allegion brand: www.allegion.com/us.
2. Models:
a. Von Duprin, XP99 series, 17 lever type.
3. Substitutions: Not permitted.

B. Exit Devices: Comply with BHMA A156.3, Grade 1.
1. Lever design to match lockset trim.
2. Provide cylinder with cylinder dogging or locking trim.
3. Provide exit devices properly sized for door width and height.
4. Provide strike as recommended by manufacturer for application indicated.
5. Provide less bottom rod (LBR) at scheduled locations to eliminate use of floor mounted strikes.
6. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.
7. For electrical options, provide quick connect plug-in pre-wired connectors.

2.05 ACCESS CONTROL LOCKS

A. Manufacturer - Access Control Lock and Exit Device:
1. Assa Abloy Brands; Sargent: www.assaabloydss.com.
2. Must be provided and installed by a manufacturer's certified integrator.
3. Model: 70 IN220 231 BIPS B EK1 NJ-### hardwired application.
a. ### = hand:
1) RHR is right hand reversed.
2) LHR is left hand reversed.
b. Coordinate wiring connection for access control device installed from each device location back to the data panel in the nearest MDF or IDF room.
1) Final connections at patch panel to be provided by the Owner.
c. Access Control programming is to be provided by the Owner.

B. Manufacturer - Exterior Trim

2.06 ELECTRIC STRIKES

A. Manufacturers:
   1. HES; an Assa Abloy Group company: www.assaabloydss.com.
   2. Models:
      a. For cylindrical locksets:
         1) HES, 1006.
      b. For rim exit device:
         1) HES, 9600.
   3. Substitutions: Not permitted.

B. Electric Strikes: Comply with BHMA A156.31, Grade 1.
   1. Provide UL (DIR) listed burglary-resistant electric strike; style to suit locks.
   2. Provide non-handed 24 VDC electric strike suitable for door frame material and scheduled lock configuration.
   3. Provide field selectable Fail Safe/Fail Secure modes.
   4. Provide transformer and rectifier as necessary for complete installation.
   5. Connect electric strikes into fire alarm where non-rated doors are scheduled to release with fire or sprinkler alarm condition.

2.07 LOCK CYLINDERS

A. Manufacturers:
   1. Best Access Systems, division of Stanley Access Technologies LLC: www.bestaccess.com.
   2. Substitutions: Not permitted.

B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
   1. Provide standard type cylinders, Grade 1, with seven-pin core in compliance with BHMA A156.5 at locations indicated.
   2. Provide high security mechanical type cylinders, Grade 1, with seven-pin core in compliance with BHMA A156.30 or UL 437 at locations indicated.
   3. Provide cylinders from same manufacturer as locking device.
   4. Provide cams and/or tailpieces as required for locking devices.
   5. Within specific Door Sections, when provisions for lock cylinder are being referenced to this Section, provide specified lock cylinder and keyed to building keying system, unless otherwise indicated.
   6. Provide exit only on exterior doors unless scheduled otherwise.

2.08 CYLINDRICAL LOCKS

A. Manufacturers:
   1. Best Access Systems, division of Stanley Access Technologies LLC: www.bestaccess.com.
   2. Model: Series 9K37-[*Function*]-14LS3626
   3. Substitutions: Not permitted.

B. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 1, 4000 Series.
   1. Bored Hole: 2-1/8 inch diameter.
   2. Latchbolt Throw: 1/2 inch, minimum.
   3. Backset: 2-3/4 inch unless otherwise indicated.
   4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
      a. Finish: To match lock or latch.
   5. Provide a lock for each door, unless otherwise indicated that lock is not required.
   6. Provide an intruder lockset for swinging door where hardware set is not indicated.
   7. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.

2.09 MORTISE LOCKS

A. Manufacturers:
   1. Best Access Systems, division of Stanley Access Technologies LLC; [Series 45H7-Function -14S626- [Door Hand]-LC.]: www.bestaccess.com.
   2. Substitutions: Not permitted.

B. Mortise Locks: Comply with BHMA A156.13, Grade 1, Security, 1000 Series.
   1. Latchbolt Throw: 3/4 inch, minimum.
   2. Deadbolt Throw: 1 inch, minimum.
   3. Backset: 2-3/4 inch unless otherwise indicated.
   4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
      a. Finish: To match lock or latch.

2.10 DOOR PULLS AND PUSH PLATES

A. Manufacturers:
   1. Rockwood or McKinney; an Assa Abloy Group company: www.assaabloydss.com.
   2. Hager Companies: www.hagerco.com.
   3. Trimco: www.trimcohardware.com.
   4. Models:
      a. Push Plate:
         1) McKinney, P054.
         2) Rockwood, 70E.
         3) Trimco, 1001-9
         4) Hager 30S
      b. Pull Plate:
         1) McKinney, DP803
         2) Rockwood, 111 x 70C
         3) Trimco, 1018-3B
         4) Hager 33G
   5. Substitutions: Not permitted.

B. Door Pulls and Push Plates: Comply with BHMA A156.6.
   1. Pull Type: Straight, unless otherwise indicated.
   2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
      a. Edges: Beveled, unless otherwise indicated.
   3. Material: Stainless steel, unless otherwise indicated.
   4. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.
   5. On solid doors, provide matching door pull and push plate on opposite faces.

2.11 COORDINATORS

A. Manufacturers:
   1. Ives, an Allegion brand: www.allegion.com/us.
   2. Trimco: www.trimcohardware.com.
   3. Hager Companies; www.hagerco.com.
   4. Models:
      a. Ives, CORG
      b. Trimco, 3093
      c. Hager 298D
   5. Substitutions: Not permitted.

B. Coordinators: Provide on doors having closers and self-latching or automatic flush bolts to ensure that inactive door leaf closes before active door leaf.
   1. Type: Bar, unless otherwise indicated.

2. Material: Stainless steel, unless otherwise indicated.
3. Ensure that coordination of other door hardware affected by placement of coordinators and carry bar is applied properly for completely operable installation.

2.12 CLOSERS

A. Manufacturers; Surface Mounted:
   1. Norton; an Assa Abloy Group company: www.assaabloydss.com.
   2. LCN, an Allegion brand: www.allegion.com/us/#sle.
   3. Models:
      a. Interior doors with multi-size tri-style packaging:
         1) Norton, 7500
         2) LCN, 4040XP
      b. Exterior doors with heavy duty non-hold open parallel arm with spring-stop:
         1) Norton, 7500 CPS
         2) LCN, 4040XP-CUSH
   4. Substitutions: Not permitted.

B. Closers: Comply with BHMA A156.4, Grade 1.
   1. Type: Surface mounted to door.
   2. Provide door closer on each exterior door.
   3. Provide door closer on each fire-rated and smoke-rated door.
      a. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.
   4. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.
   5. At corridor entry doors, mount closer on room side of door.
   6. At outswinging exterior doors, mount closer on interior side of door.

2.13 LOW ENERGY POWER AUTOMATIC OPERATORS

A. Electrified Atomatic Operators: ADA compliant type.

B. Provide wireless wall mounted actuators by same manufacturer.

C. Provide weather resistant actuators for exterior locations.

D. Operator motor voltage shall be 120 VAC.

E. Provide extended cover over operator at double door openings.

F. Provide ADA accessible symbols engraved on actuators and stickers on doors in accordance with ANSI A-117.1.

G. Manufacturers:
   1. Assa Abloy: www.assaabloy.com
   2. Models:
      a. Assa Abloy, Besam SW200i.
   3. Substitutions: Not permitted.

2.14 OVERHEAD STOPS AND HOLDERS

A. Manufacturers:
   1. Rixson or Sargent; an Assa Abloy Group company: www.assaabloydss.com/#sle.
   2. Glynn-Johnson, an Allegion brand: www.allegion.com/us/#sle.
   3. Hager Companies: www.hagerco.com.
   4. Models:
      a. Heavy duty surface:
         1) Rixson, 9.
         2) Sargent, 590.
         3) Glynn-Johnson, 90.
         4) Hager 70 Series SRF
      b. Heavy duty concealed:

1) Rixson, 1.
2) Sargent, 690.
3) Glynn-Johnson, 100.
4) Hager 70 Series CON

5. Substitutions: Not permitted.

B. Overhead Stops and Holders (Door Checks): Comply with BHMA A156.8, Grade 1.
1. Provide stop for every swinging door, unless otherwise indicated.
2. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop, unless otherwise indicated.

2.15 KICK PLATES

A. Manufacturers:
1. Trimco: www.trimcohardware.com.
2. McKinney or Rockwood an Assa Abloy Company: www.assaabloydss.com
3. Hager Companies: www.hagerco.com
4. Models:
a. McKinney, KP50.
b. Rockwood, K1050.
c. Hager 194S
d. Trimco, K0050.
5. Substitutions: Not permitted.

B. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
1. Thickness: 0.050 inch minimum.
2. Height: 10 inches unless otherwise indicated.
3. Width:
a. Single doors: 1-1/2 inch less than door width on frame stop face and 1 inch less than door width on opposite face.
b. Double doors: 1 inch less than door width on both faces of each door.
4. Bevel all four edges and countersink holes for fasteners.
5. Provide UL listed kickplates where required on fire-rated doors.

2.16 ELECTROMAGNETIC DOOR HOLDERS

A. Manufacturers:
1. Rixson; an Assa Abloy Group company: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. Models:
a. Wall mount doors with lever:
1) Rixson, 998.
2) Hager, 380F
b. Wall mount double door egress openings:
1) Rixson, 990.
2) Hager, 380S
c. Floor mount:
1) Rixson, 980.
2) Hager, 380G
4. Substitutions: See Section 016000 - Product Requirements.

B. Electromagnetic Door Holders: Comply with BHMA A156.15.
1. Type: Wall mounted, single unit, standard duty, with strike plate attached to door.
2. Holding Force, Standard Duty: 40 lbs-force, minimum.
3. Voltage: 12 VDC, and provide power supplies by same manufacturer as holders.

4. Fail safe; door released to close automatically when electrical current is interrupted.
5. Provide interface with fire detectors and fire-alarm system for fire-rated door assemblies.

2.17 WALL STOPS

A. Manufacturers:
1. Rockwood or McKinney; an Assa Abloy Group company: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. Trimco: www.trimcohardware.com.
4. Ives, an Allegion brand: www.allegion.com/us.
5. Models:
a. Wall Stop:
1) McKinney, WS04.
2) Rockwood, 403.
3) Hager, 232W
4) Trimco, 1276CCS.
5) Ives, WS402CCV.
6. Substitutions: See Section 016000 - Product Requirements.

B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
1. Provide wall stops to prevent damage to wall surface upon opening door.
2. Type: Bumper, concave, wall stop.
3. Material: Stainless steel housing with rubber insert.

2.18 ASTRAGALS

A. Manufacturers:
1. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com.
3. National Guard Products, Inc: www.ngpinc.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Astragals: Comply with BHMA A156.22.
1. Type: Split, two parts, and with sealing gasket.
2. Material: Stainless steel.
3. Provide non-corroding fasteners at exterior locations.

2.19 THRESHOLDS

A. Manufacturers:
1. Pemko or McKinney; an Assa Abloy Group company: www.assaabloydss.com.
2. National Guard Products, Inc: www.ngpinc.com.
3. Models:
4. Substitutions: See Section 016000 - Product Requirements.

B. Thresholds: Comply with BHMA A156.21.
1. Provide threshold at each exterior door, unless otherwise indicated.
2. Type: Flat surface.
3. Material: Aluminum.
4. Threshold Surface: Fluted horizontal grooves across full width.
5. Field cut threshold to profile of frame and width of door sill for tight fit.
6. Provide non-corroding fasteners at exterior locations.

2.20 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:
1. Pemko or McKinney; an Assa Abloy Group company: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com/#sle.
3. National Guard Products, Inc: www.ngpinc.com/#sle.

4. Gasketing: Weather type
    a. Models:
        1) Door bottom sweeps:
            (a) McKinney, MCK358CN.
            (b) National Guard, 202NA.
            (c) Pemko, 368CN.
        2) Frame gasket:
            (a) Hager, 891SV-DBA
            (b) McKinney, MCK2891APK.
            (c) National Guard, 700 NA.
            (d) Pemko, 2891APK.
5. Substitutions: See Section 016000 - Product Requirements.

B. Weatherstripping and Gasketing: Comply with BHMA A156.22.
1. Head and Jamb Type: Adjustable.
2. Door Sweep Type: Encased in retainer.
3. Material: Aluminum, with brush weatherstripping.
4. Provide frame-applied intumescent gasketing on wood doors that are labeled as smoke and draft control doors (Indicated as "S" on Drawings), unless otherwise indicated.
5. See Section 08 1416 when wood door to frame sealing system is applied by door manufacturer.
6. Provide weatherstripping on each exterior door at head, jambs, and meeting stiles of door pairs, unless otherwise indicated.
7. Provide door bottom sweep on each exterior door, unless otherwise indicated.
8. Provide sound-rated gasketing and automatic door bottom on doors indicated as "Sound-Rated", "Acoustical", or with "Sound Transmission Class (STC) rating"; fabricate as continuous gasketing, do not cut or notch gasketing material.

2.21 SILENCERS

A. Manufacturers:
1. Ives, an Allegion brand: www.allegion.com/us.
2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
3. Substitutions: See Section 016000 - Product Requirements.

B. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
1. Single Door: Provide three on strike jamb of frame.
2. Pair of Doors: Provide two on head of frame, one for each door at latch side.
3. Material: Rubber, gray color.

2.22 FINISHES

A. Finishes: Provide door hardware of same finish, unless otherwise indicated.
1. Primary Finish: 626; satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D); BHMA A156.18.
2. Secondary Finish: as follows:; BHMA A156.18.
    a. For exit devices only, finish is to be US28.
    b. For continuous gear hinges, finish is to be dark bronze anodized US20 for interior doors and exterior doors with dark bronze frames or US28 for exterior doors with clear anodized aluminum frames.
3. Exceptions:
    a. Where base material metal is specified to be different, provide finish that is an equivalent appearance in accordance with BHMA A156.18.
    b. Hinges for Fire-Rated Doors: Steel base material with painted finish, in compliance with NFPA 80.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

C. Use templates provided by hardware item manufacturer.

D. Do not install surface mounted items until application of finishes to substrate are fully completed.

E. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. unless otherwise noted in the Schedule:.
   1. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
   2. For FRP doors: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames" or as recommended by the manufacturer.

F. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of Section 014000 - Quality Requirements.

B. Inspection and Testing
   1. Provide functional testing and inspection of fire door assemblies by a qualified person in accordance with NFPA 80.
   2. Schedule fire door assembly inspection within 90 days of Substantial Completion of the Project.
   3. Submit a signed, written final report as specified in Paragraph 1.07.A.
   4. Correct all deficiencies and schedule a reinspection of fire door assemblies noted as deficient on the inspection report.

3.04 ADJUSTING

A. Adjust work under provisions of Section 017000 - Execution and Closeout Requirements.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

B. Clean adjacent surfaces soiled by hardware installation.

C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

D. See Section 017419 - Construction Waste Management and Disposal for additional requirements.

3.06 PROTECTION

A. Protect finished Work under provisions of Section 017000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION

SECTION 088000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Laminated glass interlayers.

D. Glazing compounds.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.

E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

F. ASTM C1036 - Standard Specification for Flat Glass.

G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

H. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass.

I. ASTM C1193 - Standard Guide for Use of Joint Sealants.

J. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.

K. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.

L. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

M. GANA (GM) - GANA Glazing Manual.

N. GANA (LGRM) - Laminated Glazing Reference Manual.

O. GANA (SM) - GANA Sealant Manual.

P. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use.

Q. NFRC 100 - Procedure for Determining Fenestration Product U-Factors.

R. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

S. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.

T. UL 972 - Standard for Burglary Resisting Glazing Material.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data on Insulating Glass Unit and Plastic Film Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience and approved by manufacturer.

1.06 FIELD CONDITIONS

A. Do not install glazing when ambient temperature is less than 40 degrees F.

B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Float Glass Manufacturers:
   1. AGC Glass North America, Inc: www.agc-yourglass.com/#sle.
   2. Cardinal Glass Industries: www.cardinalcorp.com.
   3. Guardian Glass, LLC: www.guardianglass.com.
   4. Pilkington North America Inc: www.pilkington.com/na/#sle.
   5. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
   6. Insulite Glass Company: www.insuliteglass.com.

B. Laminated Glass Manufacturers:
   1. Cardinal Glass Industries: www.cardinalcorp.com.
   2. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: www.viracon.com.
   3. Guardian Glass, LLC: www.guardianglass.com.
   4. Insulite Glass Company: www.insuliteglass.com.
   5. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with ASCE 7.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
   4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.

5. Glass thicknesses listed are minimum.

B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
   1. In conjunction with weather barrier related materials described in other sections, as follows:

C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
   1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless otherwise indicated.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
   2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
   3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
   4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.
   2. Polyvinyl Butyral (PVB) Interlayer: 0.060 inch thick, minimum.

C. Laminated Security Glass: Annealed glass laminated in accordance ASTM C1172.
   1. Laminated Security Glass: Complies with applicable performance criteria.
   2. Interlayer: Polyvinyl butyral (PVB), 0.060 inch thick minimum.
   3. Performance Criteria:
      a. Burglary Resistance: Pass UL 972 tests in compliance with level of burglary and forced-entry resistance indicated; Multiple Impact.

2.04 INSULATING GLASS UNITS

A. Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
   3. Warm-Edge Spacers: Low conductivity thermoplastic and stainless steel.
      a. Spacer Width: As required for specified insulating glass unit.
   4. Spacer Color: Black.
   5. Edge Seal:
      a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
   6. Color: Black.
   7. Purge interpane space with dry air, hermetically sealed.

B. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
   1. Applications: Exterior glazing unless otherwise indicated.
   2. Space between lites filled with argon.
   3. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
      a. Tint: Clear.

b. Coating: Low-E (passive type), on #2 surface.
4. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
a. Tint: Clear.
5. Total Thickness: 1 inch.
6. Thermal Transmittance (U-Value), Summer - Center of Glass: 0.27, nominal.
7. Visible Light Transmittance (VLT): 70 percent, nominal.
8. Shading Coefficient: 0.45, nominal.
9. Solar Heat Gain Coefficient (SHGC): 0.41 percent, nominal.
10. Visible Light Reflectance, Outside: 11 percent, nominal.
11. Glazing Method: Dry glazing method, tape and gasket spline.

C. Type IG-1S - Insulating Security Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing within 7 feet of grade..
2. Utilize Type IG-1 with following modifications:
a. Outboard Lite: Laminated security glassThickness as required to meet performance requirements

2.05 GLAZING UNITS

A. Type G-6 - Security Glazing: Laminated glass, 2-Ply.
1. Applications: Locations as indicated on drawings.
2. Tint: Clear.
3. Outer Lite: Annealed glass.
4. Interlayer: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
5. Inside Lite: Annealed glass.
6. Performance Criteria:
a. Burglary Resistance: Pass UL 972 tests in compliance with level of burglary and forced-entry resistance indicated; Multiple Impact.
7. Manufacturers:
a. Manko Window Systems, Inc; EntryGuard: www.mankowindows.com/#sle.
b. McGrory Glass Inc; DotView by McGrory Glass: www.mcgrory.com/#sle.
c. School Guard Glass; SG4 Laminated Glass: www.schoolguardglass.com
d. Substitutions: See Section 016000 - Product Requirements.

2.06 LAMINATED GLASS INTERLAYERS

A. Type LGI-1 - Polyvinyl Butyral (PVB) Interlayer for Laminated Glazing:
1. Functionality: Post-breakage safety and security.
2. Applications:
3. Color: Clear.
4. Thickness: As required for indicated performance of laminated glass application.
5. Manufacturers:
a. Eastman Chemical Company; Saflex Clear PVB Interlayer: www.saflex.com/#sle.
b. Substitutions: See Section 016000 - Product Requirements.

2.07 GLAZING COMPOUNDS

A. Type GC-2 - Butyl Sealant: Single component; ASTM C920 Grade NS Class 12-1/2 Uses M and A, Shore A hardness of 10 to 20; black color.

2.08 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
   1. Width: As required for application.
   2. Thickness: As required for application.
   3. Spacer Rod Diameter: As required for application.
   4. Manufacturers:
      a. Pecora Corporation: www.pecora.com.
      b. Tremco Global Sealants: www.tremcosealants.com.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

E. Glazing Clips: Manufacturer's standard type.

2.09 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements for additional requirements.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry immediately before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.

C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.

F. Carefully trim protruding tape with knife.

3.05 CLEANING

A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

C. Remove nonpermanent labels immediately after glazing installation is complete.

D. Clean glass and adjacent surfaces after sealants are fully cured.

E. Clean glass on both exposed surfaces not more than 2 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 090561
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
   1. Resilient tile and sheet.
   2. Carpet tile.

B. Removal of existing floor coverings.

C. Preparation of existing concrete floor slabs for installation of floor coverings.

D. Patching compound.

E. Remedial floor coatings.

1.02 RELATED REQUIREMENTS

A. Section 014000 - Quality Requirements: Additional requirements relating to testing agencies and testing.

B. Section 017419 - Construction Waste Management and Disposal: Handling of existing floor coverings removed.

1.03 REFERENCE STANDARDS

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens).

B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete.

C. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings.

1.04 SUBMITTALS

A. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
   1. Moisture and alkalinity (pH) limits and test methods.
   2. Manufacturer's required bond/compatibility test procedure.

B. Adhesive Bond and Compatibility Test Report.

C. Test Reports: For floor leveling, patching compound and remediation materials, provide independent laboratory reports and test results showing negative asbestos containing materials content using Polarized Light Microscopy (PLM) test method.

D. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
   1. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
   2. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.

1.05 QUALITY ASSURANCE

A. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.

B. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.

B. Deliver materials in manufacturer's packaging; include installation instructions.

C. Keep materials from freezing.

PART 2 PRODUCTS

2.01 MATERIALS

A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
   1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
   2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
   3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
   4. Products:
      a. USG Corporation; Durock Brand Advanced Skim Coat Floor Patch: www.usg.com/#sle.
      b. Substitutions: See Section 016000 - Product Requirements.

B. Remedial Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.

C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
   1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
   2. Products:
      a. ARDEX Engineered Cements; ARDEX MC RAPID: www.ardexamericas.com/#sle.
      b. Floor Seal Technology, Inc; MES 100 with Floor Seal FloorCem SLU: www.floorseal.com/#sle.
      c. Sika Corporation; Sikafloor Moisture Tolerance Epoxy Primer and Sikafloor Self-Leveling Moisture Tolerant Resurfacer: www.sikafloorusa.com/#sle.
      d. UZIN, a division of UFLOOR Systems Inc; Uzin NC-890 Hydro Patch: www.ufloorsystems.com/#sle.
      e. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:
   1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
      a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
      b. Removal of existing floor covering.
   2. Preliminary cleaning.
   3. Specified remediation, if required.
   4. Patching, smoothing, and leveling, as required.

5. Other preparation specified.
6. Adhesive bond and compatibility test.
7. Protection.

B. Remediations:
1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.02 REMOVAL OF EXISTING FLOOR COVERINGS

A. Comply with local, State, and federal regulations and recommendations of RFCI (RWP), as applicable to floor covering being removed.

B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.03 PREPARATION

A. See individual floor covering section(s) for additional requirements.

B. Comply with requirements and recommendations of floor covering manufacturer.

C. Remove sub-floor ridges and bumps.

D. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
1. Apply, trowel, and float filler to achieve smooth, flat, hard surface.

E. Do not fill expansion joints, isolation joints, or other moving joints.

F. Prohibit traffic until filler is cured.

3.04 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

3.05 APPLICATION OF REMEDIAL FLOOR COATING

A. Comply with requirements and recommendations of coating manufacturer.

END OF SECTION

SECTION 092116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.

B. Metal stud wall framing.

C. Gypsum wallboard

D. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

A. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing.

B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing.

C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

D. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

E. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.

F. ASTM C1396/C1396M - Standard Specification for Gypsum Board.

G. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels.

H. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels.

I. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

J. GA-216 - Application and Finishing of Gypsum Panel Products.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide data on metal framing, gypsum board, accessories, and joint finishing system.

C. Test Reports: For plaster, gypsum board panels and drywall compound, provide independent laboratory reports and test results showing negative asbestos containing materials content using Polarized Light Microscopy (PLM) test method.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

B. Fire Rated Assemblies: Provide completed assemblies complying with applicable code.

2.02 METAL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

B. Manufacturers - Metal Framing, Connectors, and Accessories:

1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
2. Custom Stud Inc: www.customstud.com
3. Marino: www.marinoware.com/#sle.
4. Telling Industries, www.buildstrong.com.
5. Substitutions: See Section 016000 - Product Requirements.

C. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
1. Studs: C-shaped with knurled or embossed faces.
2. Runners: U shaped, sized to match studs.
3. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
a. Products:
1) Same manufacturer as other framing materials.

D. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

E. Nail Guard:
1. Provide nail guard as required by local authority having jurisdiction.
2. Provide nail guard on face of studs where piping and conduit are routed through the partition within 1-1/4" of the face of the studs.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
1. American Gypsum Company: www.americangypsum.com/#sle.
2. CertainTeed Corporation: www.certainteed.com/#sle.
3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
4. National Gypsum Company: www.nationalgypsum.com/#sle.
5. PABCO Gypsum: www.pabcogypsum.com/#sle.
6. USG Corporation: www.usg.com/#sle.
7. Substitutions: See Section 016000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
3. Thickness:
a. Vertical Surfaces: 5/8 inch.
4. Paper-Faced Products:
5. Paper-Faced Products:
a. American Gypsum Company; LightRoc Gypsum Wallboard: www.americangypsum.com/#sle.
b. Georgia-Pacific Gypsum; ToughRock: www.gpgypsum.com/#sle.
c. Substitutions: See Section 016000 - Product Requirements.
6. Glass Mat Faced Products Regular and Type X:
a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
b. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C: www.gpgypsum.com/#sle.
c. National Gypsum Company; Gold Bond eXP Fire-Shield Interior Extreme Gypsum Panel: www.nationalgypsum.com/#sle.
d. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.
e. Substitutions: See Section 016000 - Product Requirements.

C. Impact Resistant Wallboard:
1. Application: High-traffic areas indicated.

2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
4. Soft Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
5. Hard Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
7. Type: Fire-resistance-rated Type X, UL or WH listed.
8. Thickness: 5/8 inch.
9. Edges: Tapered.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with AISI S220 and manufacturer's instructions.

B. Studs: Space studs at 16 inches on center.
1. Extend partition framing to structure where indicated and to ceiling in other locations.
2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.

C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

D. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
1. Orientation: Horizontal.
2. Spacing: At 16 inches on center.

E. Blocking: Install wood blocking for support of:
1. Framed openings.
2. Wall-mounted cabinets.
3. Plumbing fixtures.
4. Toilet partitions.
5. Toilet accessories.
6. Wall-mounted door hardware.

3.03 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.

D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

E. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.05 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated. Walls receiving marker board paint system including new and existing walls.
   2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   3. Level 3: Walls to receive textured wall finish.
   4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   5. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
   6. Level 0: Temporary partitions.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.

D. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

E. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.06 CORNER GUARDS

A. Install blocking and mechanical blocking anchoring, etc. required for recessed or surface mounted corner guards as detailed on the drawings above base.

3.07 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

3.08 PROTECTION

A. Protect installed gypsum board assemblies from subsequent construction operations.

END OF SECTION

SECTION 093000
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tile for floor applications.

B. Non-ceramic trim.

1.02 RELATED REQUIREMENTS

A. Section 079200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.

B. Section 092116 - Gypsum Board Assemblies: Tile backer board.

1.03 REFERENCE STANDARDS

A. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive.

B. ANSI A137.1 - American National Standard Specifications for Ceramic Tile.

C. ASTM C373 - Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

D. Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.06 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

PART 2 PRODUCTS

2.01 TILE

A. Manufacturers: All products by the same manufacturer.
   1. American Olean Corporation: www.americanolean.com/#sle.
   2. Dal-Tile Corporation: www.daltile.com/#sle.
   3. Emser Tile, LLC: www.emser.com/#sle.
   4. Terrazzo & Marble Supply Companies: www.tmsupply.com/#sle.
   5. Florida Tile; www.floridatile.com.
   6. Substitutions: See Section 016000 - Product Requirements.

B. Porcelain Tile: ANSI A137.1, standard grade.
   1. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
   2. Size: 18 by 18 inch, nominal.

3. Thickness: 3/8 inch.
4. Surface Finish: Non-slip.
5. Color(s): To be selected by Architect from manufacturer's custom range.
6. Pattern: as indicated on the drawings.

2.02 SETTING MATERIALS

A. Manufacturers:
1. ARDEX Engineered Cements: www.ardexamericas.com.
2. Bostik Inc: www.bostik-us.com.
3. Custom Building Products: www.custombuildingproducts.com.
4. LATICRETE International, Inc: www.laticrete.com.
5. Merkrete, by Parex USA, Inc: www.merkrete.com/sle.
6. Substitutions: See Section 016000 - Product Requirements.

2.03 GROUTS

A. Manufacturers:
1. ARDEX Engineered Cements: www.ardexamericas.com.
2. Bostik Inc: www.bostik-us.com.
3. Custom Building Products: www.custombuildingproducts.com.
4. LATICRETE International, Inc: www.laticrete.com.
5. Merkrete, by Parex USA, Inc: www.merkrete.com/sle.
6. Substitutions: See Section 016000 - Product Requirements.

B. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
1. Applications: Where indicated.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Products:
a. ARDEX Engineered Cements; ARDEX WA: www.ardexamericas.com/#sle.
b. Custom Building Products; CEG-IG 100% Solids Industrial Grade Epoxy Grout: www.custombuildingproducts.com/#sle.
c. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: www.laticrete.com/#sle.
d. Merkrete, by Parex USA, Inc; Merkrete Pro Epoxy: www.merkrete.com/#sle.
e. Stuart Dean Company, Inc; Marcoat GS: www.stuartdean.com/#sle.
f. Substitutions: See Section 016000 - Product Requirements.

2.04 MAINTENANCE MATERIALS

A. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
1. Composition: Water-based pigmented urethane acrylic.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Products:
a. Merkrete, by Parex USA, Inc; Merkrete Revive: www.merkrete.com/#sle.
b. Substitutions: See Section 016000 - Product Requirements.

B. Tile Sealer: Stain protection for porcelain tile tile.
1. Products:
a. Custom Building Products; Aqua Mix Enrich 'N' Seal: www.custombuildingproducts.com/#sle.
b. STONETECH, a division of LATICRETE international, Inc; STONETECH Heavy Duty Stone Sealer: www.laticrete.com/#sle.
c. Substitutions: See Section 016000 - Product Requirements.

2.05 ACCESSORY MATERIALS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.

C. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

A. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

B. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

C. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

D. Form internal angles square and external angles bullnosed.

E. Sound tile after setting. Replace hollow sounding units.

F. Keep control and expansion joints free of mortar, grout, and adhesive.

G. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

H. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

I. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

3.04 CLEANING

A. Clean tile and grout surfaces.

3.05 PROTECTION

A. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 096500
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Resilient base.

C. Installation accessories.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 090561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

C. Section 260526 - Grounding and Bonding for Electrical Systems: Grounding and bonding of static control flooring to building grounding system.

1.03 REFERENCE STANDARDS

A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

B. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

C. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile.

D. ASTM F1861 - Standard Specification for Resilient Wall Base.

E. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings.

1.04 QUALITY ASSURANCE

A. Provide sheet flooring and tile flooring supplied by one manufacturer, including leveling and patching compounds and adhesives.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Test Reports: For flooring, leveling and patching compound and adhesives, provide independent laboratory reports and test results showing negative asbestos containing materials content using Polarized Light Microscopy (PLM) test method.

C. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available.

D. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

D. Protect materials from damage by storing in a dry location.

E. Do not double stack pallets.

1.08 FIELD CONDITIONS

A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.09 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 TILE FLOORING

A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness, providing the best match of existing tile, which may entail multiple submissions and manufactures, and:
   1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
   2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648.
   3. Smoke Evolution: Maximum specific optical density of 450 or less, when tested in accordance with ASTM E 662.
   4. Size: 12 by 12 inch.
   5. VOC Content Limits: As specified in Section 016116.
   6. Thickness: 0.125 inch.
   7. Pattern: As shown on drawings.
   8. Colors: To be selected from manufacturer's full range of available colors.
      a. Selection to be made by Architect after award of contract.
      b. Allow for minimum of four colors to be selected, unless otherwise indicated, without additional cost to Owner.
      c. Colors to be homogenous in each room or space, unless otherwise indicated.

2.02 RESILIENT BASE

A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
   1. Manufacturers:
      a. Burke Flooring: www.burkeflooring.com/#sle.
      b. Johnsonite, a Tarkett Company: www.johnsonite.com.
      c. Substitutions: See Section 016000 - Product Requirements.
   2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648.
   3. Height: 6 inch.
      a. Exception: Height at casework toe kickboards shall be 4 inch4 inch.
   4. Thickness: 0.125 inch.
   5. Finish: Matte.
   6. Color: To be selected by Architect from manufacturer's full range.
   7. Accessories: Premolded external corners and internal corners.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 090561.

2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

D. Verify that required floor-mounted utilities are in correct location.

E. Report any unsatisfactory conditions in writing.

3.02 PREPARATION

A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).

B. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.

C. Prohibit traffic until filler is fully cured.

D. Clean substrate.

E. Apply primer as required to prevent "bleed-through" or interference with adhesion by substances that cannot be removed.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:
1. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to Section 260526 for grounding and bonding to building grounding system.
2. Fit joints and butt seams tightly.
3. Set flooring in place, press with heavy roller to attain full adhesion.

D. Spread only enough adhesive to permit installation of materials before initial set.

E. Fit joints and butt seams tightly.

F. Set flooring in place, press with heavy roller to attain full adhesion.

G. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.

H. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
2. Resilient Strips: Attach to substrate using adhesive.

I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

J. Install flooring in recessed floor access covers, maintaining floor pattern.

3.04 INSTALLATION - TILE FLOORING

A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.

B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.

C. Replace any tile that are telegraphing pin heads due to failure to remove debris.
1. Remove affected tile.
2. Remove debris.
3. Install new tile, do not use original tile.

3.05 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

C. Install base on solid backing. Bond tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

3.07 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

B. Protect finished floor until Substantial Completion.

END OF SECTION

SECTION 096813
TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, fully adhered.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 033000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.

C. Section 090561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

D. Section 090561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity independent testing and remediation procedures.

1.03 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials.

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

C. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

D. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.

C. Test Reports: For flooring, leveling and patching compound and adhesives, provide independent laboratory reports and test results showing negative asbestos containing materials content using Polarized Light Microscopy (PLM) test method.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in installing carpet tile with minimum five years documented experience and approved by carpet tile manufacturer.

1.06 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MATERIALS

A. Tile Carpeting, Type Modular: Patterned loop, manufactured in one color dye lot.
   1. Product: Gravity series manufactured by Tandus, A Tarkett Company: www.commercial.tarkett.com.
   2. Tile Size: , nominal.
   3. Thickness: 0.187 inch pile height.
   4. Color: As indicated on the drawings.
   5. Pattern: As indicated on the drawings.
   6. Critical Radiant Flux: Minimum of 0.45 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
   7. Smoke Evolution: Maximum specific optical density of 450 or less, when tested in accordance with ASTM E 662.

8. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
9. VOC Content: Comply with Section 016116.
10. Primary Backing Material: Powerbond.
11. Minimum Total Face Weight: 14 oz/sq yd.
12. Min. TARR: 3.5 when tested in accordance with ASTM D5252.
13. Dimensional Stability: Passing Aachen Test.

B. Carpet Tile Type Modular Walk Off: Patterned loop with scraper fibers, manufactured in one color dye lot. Provided by the owner.
1. Product: Abrasive Action II manufactured by Tandus, A Tarkett Company: www.commercial.tarkett.com.
2. Tile Size: 24 x 24 inch, nominal.
3. Thickness:0.187 inch minimum pile height.
4. Color: As indicated on the drawings.
5. Critical Radiant Flux: Minimum of 0.45 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
6. Smoke Evolution: Maximum specific optical density of 450 or less, when tested in accordance with ASTM E 662.
7. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
8. VOC Content: Comply with Section 01 6116.
9. Static Control Fiber: Invista Antron® Legacy type 6,6 or Invista Antron® Lumena with DuraTech® soil resistance treatment.
10. Max. Electrostatic Charge: 3 Kv. at 20 percent relative humidity.
11. Minimum Total Face Weight: 24 oz/sq yd.
12. Min. TARR: 3.5 when tested in accordance with ASTM D5252.
13. Dimensional Stability: Passing Aachen Test.

2.02 ACCESSORIES

A. Sub-Floor Filler: Type recommended by flooring material manufacturer, no latex material allowed.

B. Edge Strips: Embossed aluminum, color as selected by Architect.

C. Stair Nosing: As specified in Section 096500.

D. Adhesives:
1. Compatible with materials being adhered; maximum VOC content as specified in Section 016116.

E. Carpet Tile Adhesive: Recommended by carpet tile manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.

C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

D. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
1. Test in accordance with Section 090561.
2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates for installation of flooring in accordance with Section 090561.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install carpet tile in accordance with manufacturer's instructions.

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Lay carpet tile in square pattern, with pile direction alternating to next unit, set aligned as indicated on shop drawings.

F. Locate change of color or pattern between rooms under door centerline.

G. Trim carpet tile neatly at walls and around interruptions.

H. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

END OF SECTION

SECTION 099113
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Non-metallic roofing and flashing.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Ceramic and other types of tiles.
   9. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
   10. Exterior insulation and finish system (EIFS).
   11. Glass.
   12. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.

C. SSPC-SP 1 - Solvent Cleaning.

D. SSPC-SP 2 - Hand Tool Cleaning.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit two paper chip samples, 4 x 4 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years documented experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: 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.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
   2. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.

B. Paints:
   1. Behr Process Corporation: www.behr.com/#sle.
   2. Glidden Paint: www.glidden.com
   3. PPG Paints: www.ppgpaints.com/#sle.
   4. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: Not permitted.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

B. Flammability: Comply with applicable code for surface burning characteristics.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

D. Colors: As indicated in Color Schedule.
   1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
   2. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
   1. One coat of alkyd primer.
   2. Gloss: Two coats of alkyd enamel; use this sheen for all locations unless otherwise indicated.

B. Paint MgE-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
   1. One coat galvanize primer.
   2. Gloss: Two coats of alkyd enamel; use this sheen for all locations unless otherwise indicated.

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
   1. Alkyd Primer for Galvanized Metal.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.

H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

I. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS

A. Steel Fabrications: Finish surfaces exposed to view.
   1. Exterior: ME-OP-3A, gloss; finish all surfaces, including concealed surfaces, before installation.

B. Galvanized Steel: Finish surfaces exposed to view.
   1. Exterior: Paint MgE-OP-3A, gloss.

END OF SECTION

SECTION 099123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. All miscellaneous steel and unfinished metal elements.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Marble, granite, slate, and other natural stones.
   6. Floors, unless specifically indicated.
   7. Ceramic and other tiles.
   8. Glass.
   9. Acoustical materials, unless specifically indicated.
   10. Concealed pipes, ducts, and conduits.
   11. Bathroom and Accessories
   12. FRP Doors

1.02 RELATED REQUIREMENTS

A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 092116 - Gypsum Board Assemblies: New and existing wall preparation for final finish.

1.03 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.

C. SSPC-SP 1 - Solvent Cleaning.

D. SSPC-SP 2 - Hand Tool Cleaning.

E. SSPC-SP 6 - Commercial Blast Cleaning.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
   2. MPI product number (e.g., MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: 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.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for submittals.
   2. Substitution of MPI-approved products by a different manufacturer is preferred over substitution of unapproved products by the same manufacturer.
   3. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.

B. Paints:
   1. Behr Process Corporation: www.behr.com/#sle.
   2. Glidden Paint: www.glidden.com
   3. PPG Paints: www.ppgpaints.com/#sle.
   4. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: Not permitted.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 016116.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: As indicated on drawings.
   1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
   2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
   3. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

2.03 PAINT SYSTEMS - INTERIOR

A. Paint I-TR-C - Transparent Finish on Concrete Floors.
   1. 1 coat stain.
   2. Sealer: Water Based Sealer for Concrete Floors; MPI #99.
   3. Sealer Sheen:
      a. Gloss: MPI gloss level 6; use this sheen at all locations.

B. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. One coat of latex primer.
   2. Semi-gloss: Two coats of latex enamel.

C. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
   1. Touch-up with latex primer.
   2. Semi-gloss: Two coats of latex enamel; use this sheen for all locations unless otherwise indicated.

D. Paint MgI-OP-3L - Galvanized Metals, Latex, 3 Coat:
   1. One coat galvanize primer.
   2. Semi-gloss: Two coats of latex enamel.

E. Paint GI-OP-3LA - Gypsum Board/Plaster, Latex-Acrylic, 3 Coat:
   1. One coat of latex primer sealer.
   2. Eggshell: Two coats of latex-acrylic enamel; use this sheen for all locations unless otherwise indicated.

F. Paint GI-P-1A - Gypsum Board/Plaster, Primer, 1 Coat:
   1. One coat of latex primer sealer.

2.04 PRIMERS

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
   1. Interior Institutional Low Odor/VOC Primer Sealer; MPI #149.
   2. Concrete Floor Primer, Waterborne; MPI #99.
   3. Interior Rust-Inhibitive Water Based Primer; MPI #107.
   4. Interior Water Based Primer for Galvanized Metal; MPI #134 or #134 X-Green.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

I. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high-alkali surfaces.

J. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.

K. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

L. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
   3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.06 SCHEDULE - PAINT SYSTEMS

A. Concrete Floors: Transparent finish for concrete floors
   1. Interior: I-TR-C, gloss

B. Gypsum Board: Finish surfaces exposed to view.

C. Plaster: Finish surfaces exposed to view.
   1. Interior Walls and Ceilings: GI-OP-3LA.

D. Steel Fabrications: Finish surfaces exposed to view.
   1. Interior: MI-OP-3L, gloss.

E. Galvanized Steel: Finish surfaces exposed to view.
   1. Interior: Mgl-OP-3L.

F. Shop-Primed Metal Items: Finish surfaces exposed to view.
   1. Finish the following items:
      a. Exposed surfaces of steel stairs and railings.
      b. Mechanical equipment.
   2. Interior: MI-OP-2L.

END OF SECTION

SECTION 099733
ENCAPSULATION OF ASBESTOS CONTAINING MATERIALS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. The work includes the encapsulating of the following:
   1. Lock down of removal work areas and abated surfaces
   2. Sealing of exposed edges
   3. Architectural Finish

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's technical information including label analysis and application instructions for each material proposed for use.

B. Material Safety Data Sheet: Submit the Material Safety Data Sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for each surfactant and encapsulating material proposed for use on the work. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

C. Installation Instructions: Submit manufacturer's installation instructions with specific project requirements noted.

1.03 DELIVERY AND STORAGE

A. Deliver materials to the job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
   1. Name or title of material
   2. Manufacturer's stock number and date of manufacture
   3. Manufacturer's name
   4. Thinning instructions
   5. Application instructions

B. Deliver materials together with a copy of the OSHA Material Safety Data Sheet for the material.

1.04 JOB CONDITIONS

A. Apply encapsulating materials only when environmental conditions in the work area are as required by the manufacturer's instructions.

PART 2 PRODUCTS

2.01 ENCAPSULANTS

A. Provide penetrating, bridging type, and/or lockdown encapsulants specifically designed for application to the asbestos-containing material and abated surfaces to which it is being applied and is compatible with the substrate.

PART 3 EXECUTION

3.01 GENERAL

A. Prior to applying any encapsulating material, ensure that application of the sealer will not cause the base material to fail and allow the sealed material to fall of its own weight or separate from the substrate. Should Contractor doubt the ability of the installation to support the sealant, request direction from the Manufacturer before proceeding with the encapsulating work.

B. Do Not Commence Application of encapsulating materials until all removal work within the work area has been completed.

3.02 WORKER PROTECTION

A. Before beginning work with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment, which may include combination HEPA/chemical cartridges. Require that appropriate protective equipment be used at all times.

3.03 ENCAPSULATION (LOCKDOWN) OF ABATED SURFACES

A. Color the lockdown encapsulant so that visual confirmation of complete and uniform coverage of each coat is possible. Adhere to manufacturer's instructions for coloring.

B. Encapsulate all surfaces in full compliance with manufacturer’s instructions.

3.04 SEALING EXPOSED EDGES

A. Seal edges of Asbestos-Containing Material exposed by removals with two (2) coats of encapsulant.

B. Prior to sealing, permit the exposed edges to dry completely to permit penetration of the sealer.

C. Color the encapsulant contrasting colors in alternate coats so that visual confirmation of complete and uniform coverage of each coat is possible. Adhere to manufacturer's instructions for coloring. At the completion of work the encapsulated surface must be a uniform third color produced by the mixture.

3.05 ARCHITECTURAL FINISH

A. Examine Existing Conditions: Determine if the friable Asbestos-Containing Material to be encapsulated remains sufficiently bonded to receive the encapsulation process and if process will effectively prevent release of asbestos fibers from the material. If the existing
   1. Asbestos-Containing Material is loose and deteriorated, the Contractor must immediately notify the Owner's Representative that removal of friable Asbestos-Containing Material must be accomplished before encapsulation.

B. Before start of work on an architectural finish complete the work of the following:
   1. Section 015733 Worker Protection
   2. Section 015736 Respiratory Protection
   3. Section 015643 Temporary Enclosures
   4. Section 015726 Decontamination Units

C. Comply with all manufacturer's instructions for particular conditions of installation in each case. Consult with manufacturer's technical representative for conditions not covered.

D. Encapsulate all surfaces in full compliance with manufacturer's procedures.

E. At completion of Encapsulation and before removal of Work Area enclosures and Negative Pressure System, decontaminate space in accordance with requirements of Sections 017333 Project Decontamination.

END OF SECTION

SECTION 101400
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Room identification and interior door signs.

B. Window Signs

C. Exterior Door Signs

1.02 REFERENCE STANDARDS

A. St. Louis County Police and Fire Chiefs Premises Identification Ordinance - Guidelines for Premises Identification for Educational Group E Facilities.

B. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.

C. ADA Standards - 2010 ADA Standards for Accessible Design.

D. ICC A117.1 - Accessible and Usable Buildings and Facilities.

1.03 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
3. Submit for approval by Owner through Architect prior to fabrication.

D. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

1.04 QUALITY ASSURANCE

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Package room identification and door frame signs in sequential order of installation, labeled by floor or building.

PART 2 PRODUCTS

2.01 SIGNAGE APPLICATIONS

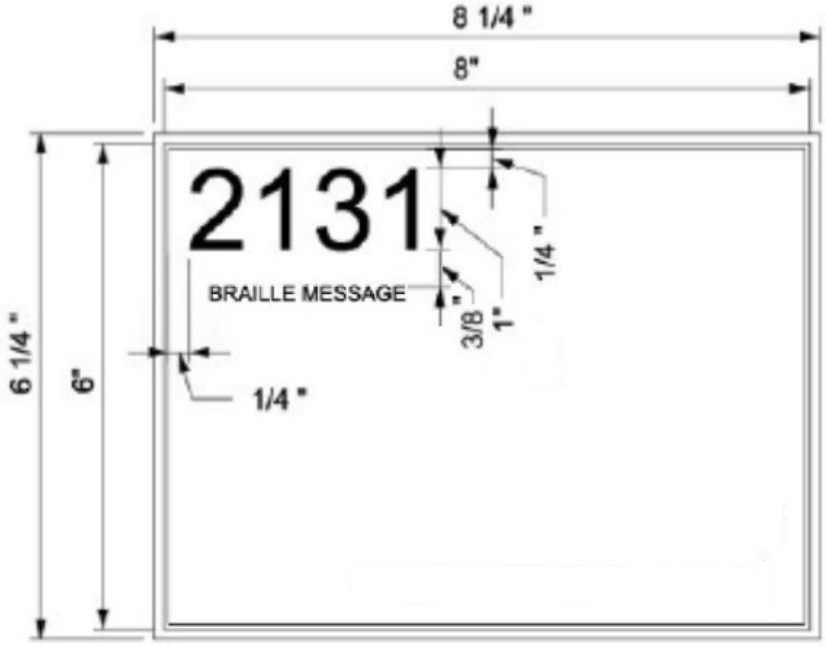
A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

B. Room Identification Signs: Provide a sign for every doorway, whether it has a door or not, within the limits of the Work as scheduled.

1. Sign Type: Flat signs with frame with engraved panel media as specified.
2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
3. Character Height: 1 inch.
4. Sign Size: 6 inches height by 8 inches width.
5. Sign Text:

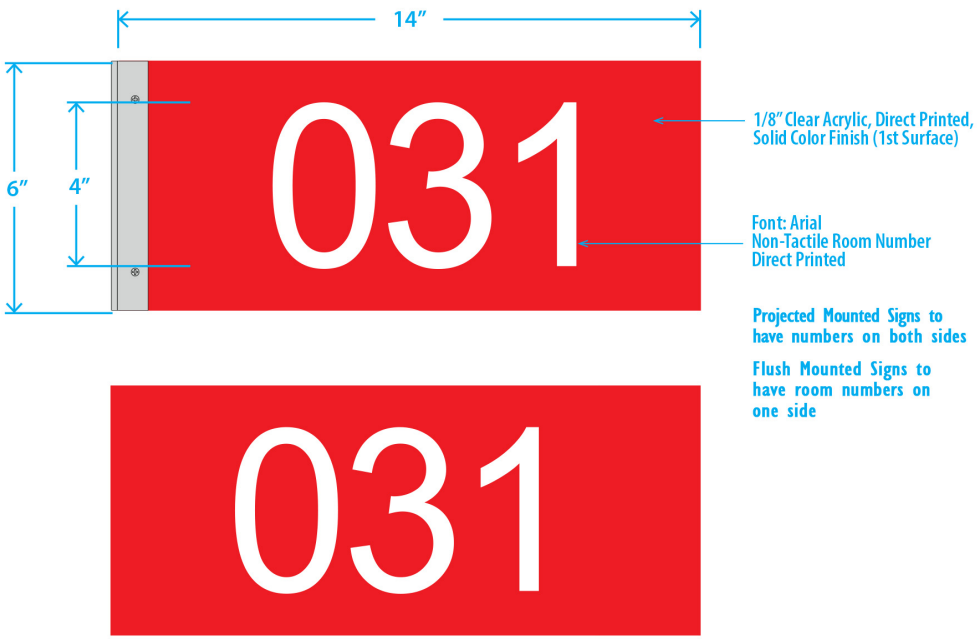
a. First Line: Room number as shown on the drawings.
b. Second Line: Braille message including first line text information.

6. Example sign indicating layout requirements follows:

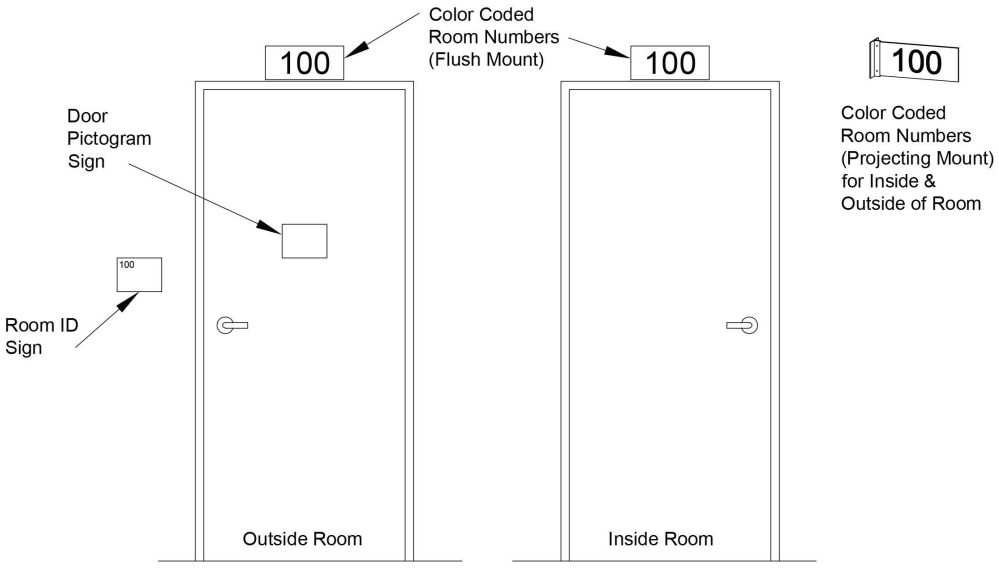


C. Interior Door Signs: Provide a sign above every interior door frame within the limits of the Work as scheduled.

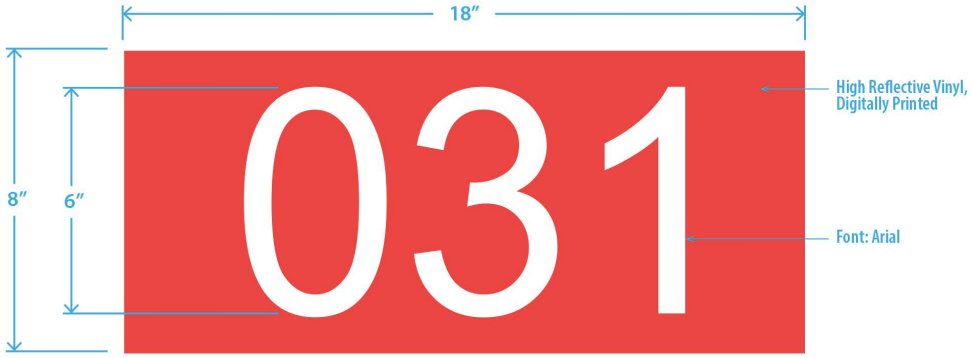
1. Sign Type: Flat signs with numerical room number on ingress/corridor side and egress/room side of door without frame assigned the color of the zone they occupy. Room numbers shall be readable from all angles from the corridor or area to which they open. Use projected signs as required for readability with numbers on both sides. Door flush signs to have room numbers on one side.
2. Character Height: 4 inches.
3. Sign Size: 6 inches height by 14 inches width.
4. Sign Text: Room number as shown on the drawings.
5. Sign is not required to meet ADA Standards for Accessible Design.
6. Example sign indicating layout requirements follows:



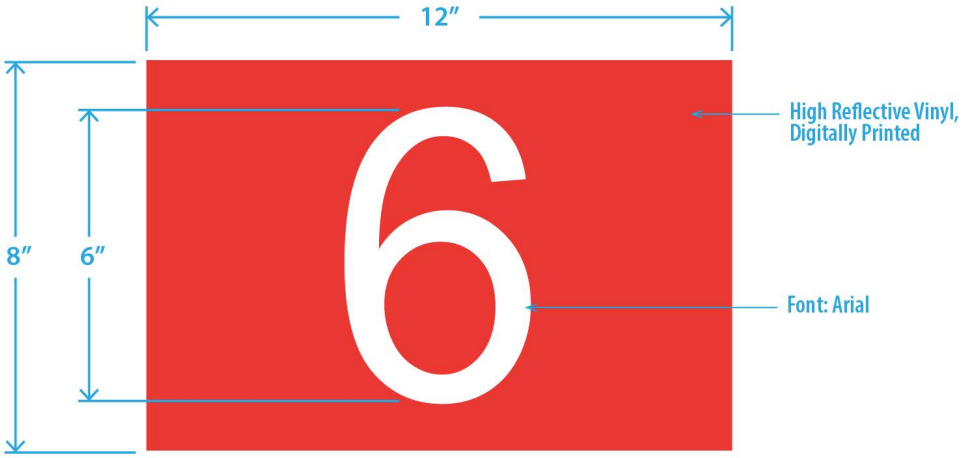
Interior Doors:



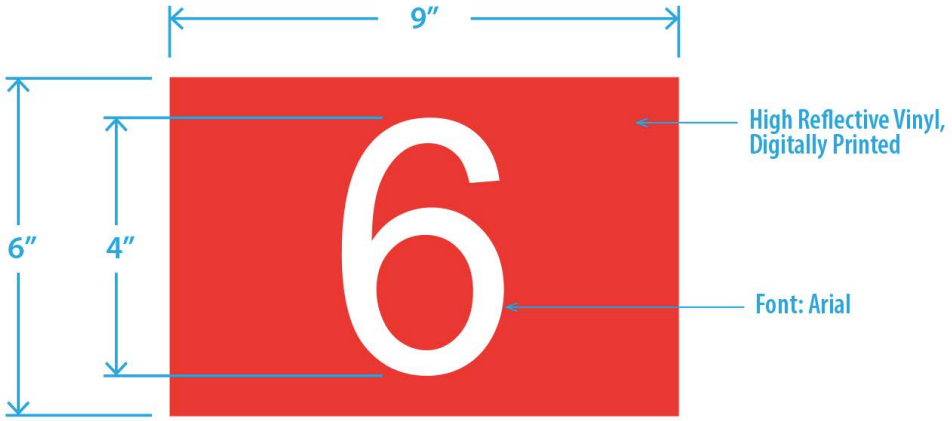
D. Window Signs: Provide a sign on left most facing window mounted on the interior or exterior visible from the exterior within the limits of the Work as scheduled.
   1. Sign Type: Flat signs with numerical room number mounted on left most facing exterior window without frame assigned the color of the zone they occupy. Window flush signs to have room numbers on one side visible from the exterior.
   2. Character Height: 6 inches.
   3. Sign Size: 8 inches height by 18 inches width.
   4. Sign Text: Room number as shown on the drawings.
   5. Sign is not required to meet ADA Standards for Accessible Design.
   6. Example sign indicating layout requirements follows:



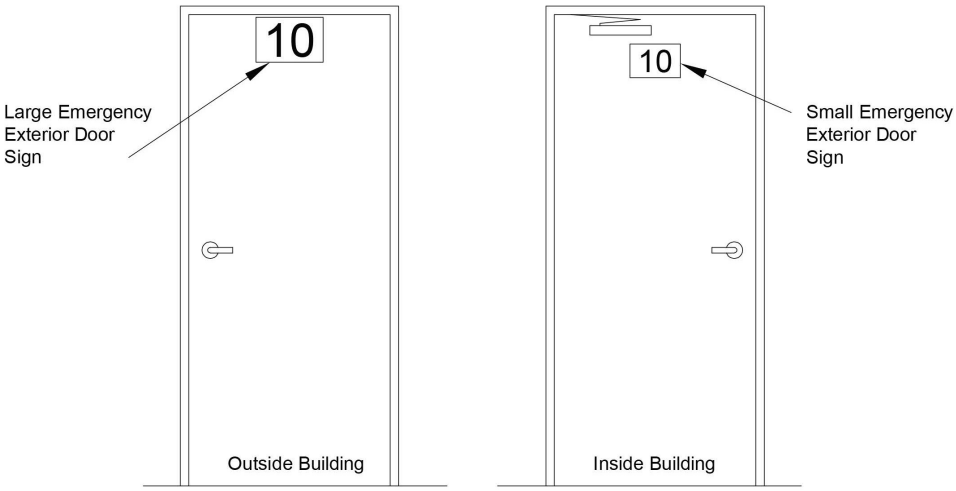
E. Exterior Door Signs: Exterior doors are to be numbered in sequential order starting with the main entrance #1 within the limits of the Work as scheduled. Subsequent door shall be numbered in sequential order in a clockwise manner.
   1. Sign Type: Flat signs with numerical door number mounted on exterior and interior side of door without frame assigned the color of the zone they occupy.
   2. Character Height:
      a. Exterior of door: 6 inches.
      b. Interior of door: 4 inches.
   3. Sign Size:
      a. Exterior of door: 8 inches height by 12 inches width.
      b. Interior of door: 6 inches height by 9 inches width.
   4. Sign Text: Room number as shown on the drawings.
   5. Sign is not required to meet ADA Standards for Accessible Design.
   6. Example sign indicating layout requirements follows:
      Exterior:



      Interior:



Exterior Doors:



2.02 SIGN TYPES

A. Flat Signs: Signage media with frame.
   1. Basis of Design: Gravotech, Inc.; www.gravograph.us
   2. Edges: Square.
   3. Corners: Square.
   4. Removable signage media held in frame with adhesive snap locks, model Gravograph 36352.
   5. Frame:
      a. Molded plastic, color black.
      b. Size 6 inch by 6 inch, model Gravograph 35025.
      c. Size 6 inch by 8 inch or 8 inch by 6 inch, model Gravograph 35028.
   6. Wall Mounting of Signs: Concealed screws.

B. Flat Signs: Signage media without frame.
   1. Edges: Bevelled.
   2. Corners: Square.
   3. Wall Mounting of Signs: Exposed screw.

C. Interior Door and Window Signs (mounted on interior):

1. Edges: Square
2. Corners: Square
3. Mounting of Signs: Tape adhesive
4. Core: Sintra or equal foam PVC 3mm thick.
5. Finish: UV Cured Ink

D. Exterior Door and Window Signs (mounted on exterior):
1. Edges: Square
2. Corners: Square
3. Mounting of Signs: Use clear silicone adhesive
4. Core: Dibond or equal aluminum clad foam PVC core 3mm thick.
5. Finish: UV Cured Ink

E. Color and Font: Unless otherwise indicated:
1. Character Font: Helvetica, Arial, or other sans serif font.
a. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.
2. Character Case: Upper case only.
3. Background Color:
a. Room Identification and Pictogram Signs - Black
b. Interior Door Signs, Window Signs, and Exterior Door Signs assigned the color of the zone they occupy
4. Character Color: White.

2.03 TACTILE SIGNAGE MEDIA

A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
1. Total Thickness: 1/16 inch.

2.04 NON-TACTILE SIGNAGE MEDIA

A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as text color:
1. Total Thickness: 1/16 inch.

2.05 SAFETY SIGNAGE - ZONE IDENTIFICATION

A. Zone Designation: All occupiable structures on the premises shall be divided into sections or designated a specific zone agreeable to the AHJ.

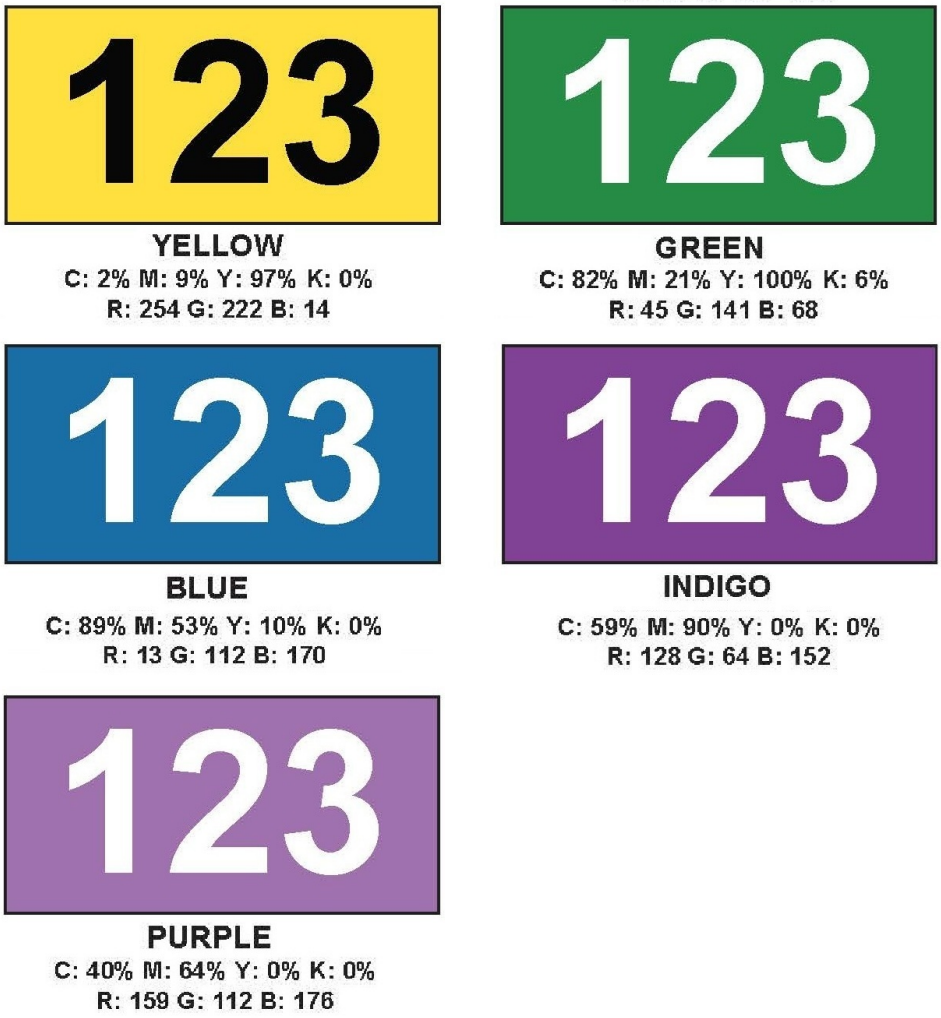
B. Zone Color Assignment: The zones shall be assigned a primary or secondary color. Other colors may be used/added of approved by the AHJ.



RED
C: 0% M: 100% Y: 100% K: 0%
R: 237 G: 28 B: 36



ORANGE
C: 6% M: 68% Y: 91% K: 0%
R: 229 G: 114 B: 50



2.06 ACCESSORIES

A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

B. Exposed Screws: Stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install neatly, with horizontal edges level.

C. Locate signs as follows unless otherwise indicated:

1. Room Identification Signs:
    a. Mounting height at 48 inches above finished floor to bottom outside edge of sign frame.
    b. Locate on wall at latch side of door as close as possible to the door with a minimum distance of 6 inches from latch edge of door to closest vertical outside edge of sign frame.

c. At double doors, the sign shall be to the right of the right-hand door.
d. Where there is no wall space on the latch side of a single door, or to the right side of double doors, signs shall be on the nearest adjacent wall.

2. Door Signs:
   a. Interior flush signs: Locate above door frame on ingress/corridor side and egress/room side centered on the horizontal centerline of the door frame head with bottom of sign resting on the top of the door frame.
   b. Interior pedestal signs: Use projected signs as required for readability with numbers on both sides.
   c. Provide 2 fasteners, one at each end of the sign on the horizontal centerline of sign.
3. Window Signs:
   a. Mount to exterior window on the interior (or exterior if interior has security flim installed) of the left most facing window. Attach to glass so it is visible from the exterior.
4. If no location is indicated obtain Owner's instructions.

D. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 312200
GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of topsoil.

B. Rough grading the site for pavements.

C. Replacement of topsoil and finish grading.

1.02 RELATED REQUIREMENTS

A. Section 311000 - Site Clearing.

B. Section 312316 - Excavation.

C. Section 312316.13 - Trenching: Trenching and backfilling for utilities.

D. Section 312323 - Fill: Filling and compaction.

E. Section 329223 - Sodding: Finish ground cover.

1.03 SUBMITTALS

A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil- Soil Type S2: Topsoil excavated on-site.
   1. Graded.
   2. Acidity range (pH) of 5.5 to 7.5.
   3. Containing a minimum of 4 percent and a maximum of 30 percent inorganic matter.
   4. Conforming to ASTM D2487 Group Symbol OL, OH, and PT.
   5. Limit decaying matter to 10 percent of total content by volume.
   6. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Call Missouri One Call System at 1-800-DIG-RITE (1-800-344-7483) not less than two working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

C. Stake and flag locations of known private utilities.

D. Locate, identify, and protect from damage above- and below-grade utilities to remain.

E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded.

B. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

C. Do not remove wet subsoil , unless it is subsequently processed to obtain optimum moisture content.

D. When excavating through roots, perform work by hand and cut roots with sharp axe.

E. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

F. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

G. Level and contour surfaces to elevations and gradients indicated.

3.04 SOIL REMOVAL AND STOCKPILING

A. Remove excavated topsoil from site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 3 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches.

E. Place topsoil in areas where sodding and planting are indicated.

F. Place topsoil where required to level finish grade.

G. Place topsoil to the following compacted thicknesses:
   1. Areas to be Sodded: 6 inches

H. Place topsoil during dry weather.

I. Remove roots, weeds, rocks, and foreign material while spreading.

J. Near plants and buildings spread topsoil manually to prevent damage.

K. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

L. Roll placed topsoil.

M. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.

B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

C. Top Surface of Finish Grade at Curbs and Sidewalks: Top of curb or sidewalk elevation or greater.

D. Top Surface of Finish Grade at Pavement Edges: Top of pavement elevation.

3.07 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition at no cost to Owner.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.08 FIELD QUALITY CONTROL

A. See Section 312323 - Fill for compaction density testing.

3.09 CLEANING

A. Remove unused stockpiled subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 312316
EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for paving and site structures.

B. Trenching for utilities outside the building to utility main connections.

1.02 PRICE AND PAYMENT PROCEDURES

A. See Section 012200 - Unit Prices, for general requirements applicable to unit prices for excavation.

B. Unit Price A : Excavating Unsuitable Soil Materials:
   1. Measurement method: By the cubic yard.
   2. Includes: Excavating below required elevations to remove unsuitable soil materials, loading and removing from site.
   3. Does Not Include Over-Excavation: Payment will not be made for over-excavated work nor for replacement materials.

C. See Section 312323 - Fill, for measurement and payment provisions related to fill.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Call Missouri One Call System at 1-800-DIG-RITE (1-800-344-7483) not less than two working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

C. Locate, identify, and protect utilities that remain and protect from damage.

D. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.03 EXCAVATING

A. Underpin adjacent structures that could be damaged by excavating work.

B. Excavate to accommodate new structures and construction operations.

C. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

D. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

E. Do not interfere with 45 degree bearing splay of foundations.

F. Cut utility trenches wide enough to allow inspection of installed utilities.

G. Hand trim excavations. Remove loose matter.

H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 312323.

I. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

J. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect. If the proposed excavation extends more than 1 foot into the excavation, control groundwater intrusion with a comprehensive dewatering procedures, or as directed by the Geotechnical Engineer.

K. Remove excavated material that is unsuitable for re-use from site.

L. Stockpile excavated material to be re-used in area designated on site in accordance with Section 312200.

M. Remove excess excavated material from site.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.

B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.05 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

SECTION 312316.13
TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Section 312200 - Grading: Site grading.

1.03 PRICE AND PAYMENT PROCEDURES

A. See Section 012200 - Unit Prices, for general requirements applicable to unit prices for earthwork.

B. Unit Price B : Excavating Unsuitable Soil Materials:
   1. Measurement method: By the cubic yard.
   2. Includes: Excavating below required elevations, loading and removing from site.
   3. Does Not Include Over-Excavation: Payment will not be made for over-excavated work nor for replacement materials.

C. Granular Fill Replacing Unsuitable Soil: Applies to Unit Price B .
   1. Measurement Method: By the cubic yard in place.
   2. Includes: Supplying fill, stockpiling, scarifying substrate surface, placing where required, and compacting.

D. Geotextile Stabilization Fabric: Applies to Unit Price C .
   1. Measurement Method: By the Square yard in place.
   2. Includes: Cutting and placing where required.

1.04 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: Indicated on drawings and to meet requirements for topsoil placement specified in Section 312200 - Grading.

1.05 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.

D. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

E. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

F. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

G. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Samples: 10 lb sample of each type of imported fill; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

E. Compaction Density Test Reports by Owner's Testing Agency.

1.07 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill- Fill Type S1: Subsoil excavated on site or imported borrow material.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   3. Complying with ASTM D2487 Group Symbol CL.

B. Concrete for Fill: Lean concrete. Minimum compressive strength of 2500 psi.

C. Granular Fill Under Pavements and Structures - Fill Type A1: Coarse aggregate, conforming to County of St. Louis Department of Highways and Traffic standard specification section 1007 - Aggregate Base Material, Type 5.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 1 inch sieve: 100 percent passing.
      b. 1/2 inch sieve: 90 to 60 percent passing.
      c. No. 4 sieve: 60 to 35 percent passing.
      d. No. 30 sieve: 35 to 10 percent passing.
      e. No. 200 sieve: 15 to 0 percent passing.
      f. The fraction passing the No. 40 sieve shall have a maximum plasticity index of 6.

D. Granular Fill Replacing Unsuitable Soil - Fill Type A2: Coarse aggregate, conforming to ASTM D448 standard specification size number 357.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 2-1/2 inch sieve: 100 percent passing.
      b. 2 inch sieve: 100 to 95 percent passing.
      c. 1 inch sieve: 70 to 35 percent passing.
      d. 1/2 inch sieve: 30 to 10 percent passing.
      e. No. 4 sieve: 5 to 0 percent passing.

E. Granular Fill for Drainage - Fill Type A3: Coarse aggregate, conforming to County of St. Louis Department of Highways and Traffic standard specification section 1009 - Aggregate For Drainage, Grade 3.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 1 inch sieve: 100 percent passing.
      b. 3/4 inch sieve: 100 to 85 percent passing.
      c. 3/8 inch sieve: 55 to 15 percent passing.
      d. No. 4 sieve: 10 to 0 percent passing.

F. Bedding for Utility Pipes and Conduits, 3 Inch Diameter And Over - Fill Type A4: Coarse aggregate, conforming to ASTM D 448 standard specification size number 68.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 1 inch sieve: 100 percent passing.
      b. 3/4 inch sieve: 100 to 90 percent passing.
      c. 3/8 inch sieve: 65 to 30 percent passing.

d. No. 4 sieve: 25 to 5 percent passing.
e. No. 8 sieve: 10 to 0 percent passing.

G. Bedding for Sanitary and Storm Sewer Pipes - Fill Type A5: Coarse aggregate, conforming to Metropolitan St. Louis Sewer District standard specification section 2.K.2 - MSD-1 Bedding.
1. Graded in accordance with ASTM C 136, within the following limits:
a. 1 inch sieve: 100 percent passing.
b. 3/4 inch sieve: 100 to 90 percent passing.
c. 1/2 inch sieve: 60 to 35 percent passing.
d. No. 100 sieve: 10 to 0 percent passing.

H. Sand - Fill Type A7: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
1. Grade in accordance with ASTM D2487 Group Symbol SW.

I. Topsoil: See Section 312200.

2.02 ACCESSORIES

A. Geotextile Stabilization Fabric: Non-biodegradable, woven; Mirafi-HP570 manufactured by TenCate. www.tencate.com

B. Substitutions: See Section 016000 - Product Requirements.

2.03 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Call Missouri One Call System at 1-800-DIG-RITE (1-800-344-7483) not less than two working days before performing Work.
1. Request underground utilities to be located and marked within and surrounding construction areas.

C. Locate, identify, and protect utilities that remain and protect from damage.

D. Notify utility company to remove and relocate utilities.

E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

F. Protect plants, lawns, rock outcroppings, and other features to remain.

G. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.03 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Drawings.
1. Architect reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.04 TRENCHING

A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until sheeted or shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches 2 feet wider than outside diameter of pipe or conduit unless indicated otherwise on Drawings.

E. Hand trim excavations. Hand trim for bell and spigot pipe joints. Remove loose matter.

F. Provide uniform and continuous bearing and support for bedding material, pipes, and conduits.

G. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

H. Remove water or materials from the trench that interfere with Work.

I. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume. See Section 312316.26 for removal of larger material.

J. Remove excavated material that is unsuitable for re-use from site.

K. Stockpile excavated material to be re-used in area designated on site in accordance with Section 312200.

L. Remove excess excavated material from site.

M. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

N. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

O. Do not advance open trench more than 200 feet ahead of installed pipe.

3.05 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches more than 4 feet deep excavated through unstable, loose, or soft material.
   1. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.
   2. Design sheeting, shoring, bracing, or other protection to be removed at completion of excavation work.

C. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil at no cost to Owner.

D. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing at no cost to Owner.

3.06 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place to elevations directed by Architect. Line over excavated trench bottom and sides with Geotextile Stabilization Fabric. Backfill to original subgrade elevation with Fill Type A2.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.07 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

H. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Correct areas that are over-excavated.
   1. Thrust bearing surfaces: Fill with concrete.
   2. All areas except thrust bearing surfaces: Use Fill Type A1, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

J. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
   2. At other locations: 90 percent of maximum dry density.

K. Do not leave more than 50 feet of trench open at end of working day.

L. Protect open trench to prevent danger to Owner and the public.

M. Reshape and re-compact fills subjected to vehicular traffic.

3.08 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. Utility Piping and Conduits Under 3 Inch Diameter:
   1. Bedding: Use Fill Type A7.
   2. Cover with Fill Type S1 under landscape areas.
   3. Cover with Fill Type A1 under pavements and structures.

B. Utility Piping and Conduits 3 Inch Diameter And Over:
   1. Bedding: Use Fill Type A4.
   2. Cover with Fill Type S1 under landscape areas.
   3. Cover with Fill Type A1 under pavements and structures.

C. Sanitary and Storm Sewer Piping:
   1. Bedding: Use Fill Type A5 or A6 as appropriate for pipe size and material.
   2. Cover with Fill Type S1 under landscape areas.
   3. Cover with Fill Type A1 under pavements and structures.

3.09 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1/2 inch from required elevations.

3.10 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: 1 test for each lift for each 100 feet of trench length.

3.11 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 312323
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Section 312200 - Grading: Removal and handling of soil to be re-used.

B. Section 312200 - Grading: Site grading.

C. Section 312316 - Excavation: Removal and handling of soil to be re-used.

D. Section 312316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.03 PRICE AND PAYMENT PROCEDURES

A. See Section 012200 - Unit Prices, for general requirements applicable to unit prices for earthwork.

B. Granular Fill Replacing Unsuitable Soil: Applies to Unit Price A .
   1. Measurement Method: By the cubic yard.
   2. Includes: Excavating existing material, stockpiling, scarifying substrate surface, placing where required, compacting, and dewatering.

C. Geotextile Stabilization Fabric: Applies to Unit Price C .
   1. Measurement Method: By the Square yard in place.
   2. Includes: Cutting and placing where required.

1.04 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: Indicated on drawings.

1.05 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.

C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

D. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

E. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Samples: 10 pounds sample of each type of imported fill; submit in air-tight containers to testing laboratory.

C. Materials Sources: Submit name of imported materials source.

D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

1.07 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill- Fill Type S1: Subsoil excavated on site or imported borrow material.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   3. Complying with ASTM D2487 Group Symbol CL.

B. Concrete for Fill: Lean concrete Minimum compressive strength of 2500 psi.

C. Granular Fill - Fill Type A1: Coarse aggregate, conforming to County of St. Louis Department of Highways and Traffic standard specification section 1007 - Aggregate Base Material, Type 5.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 1 inch sieve: 100 percent passing.
      b. 1/2 inch sieve: 90 to 60 percent passing.
      c. No. 4 sieve: 60 to 35 percent passing.
      d. No. 30 sieve: 35 to 10 percent passing.
      e. No. 200 sieve: 15 to 0 percent passing.
      f. The fraction passing the No. 40 sieve shall have a maximum plasticity index of 6.

D. Granular Fill Replacing Unsuitable Soil - Fill Type A2: Coarse aggregate, conforming to ASTM D448 standard specification size number 357.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 2-1/2 inch sieve: 100 percent passing.
      b. 2 inch sieve: 100 to 95 percent passing.
      c. 1 inch sieve: 70 to 35 percent passing.
      d. 1/2 inch sieve: 30 to 10 percent passing.
      e. No. 4 sieve: 5 to 0 percent passing.

E. Granular Fill for Drainage - Fill Type A3: Coarse aggregate, conforming to County of St. Louis Department of Highways and Traffic standard specification section 1009 - Aggregate For Drainage, Grade 3.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 1 inch sieve: 100 percent passing.
      b. 3/4 inch sieve: 100 to 85 percent passing.
      c. 3/8 inch sieve: 55 to 15 percent passing.
      d. No. 4 sieve: 10 to 0 percent passing.

F. Bedding for Utility Pipes and Conduits, 3 Inch Diameter And Over - Fill Type A4: Coarse aggregate, conforming to ASTM D 448 standard specification size number 68.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 1 inch sieve: 100 percent passing.
      b. 3/4 inch sieve: 100 to 90 percent passing.
      c. 3/8 inch sieve: 65 to 30 percent passing.
      d. No. 4 sieve: 25 to 5 percent passing.
      e. No. 8 sieve: 10 to 0 percent passing.

G. Topsoil: See Section 312200.

2.02 ACCESSORIES

A. Geotextile Stabilization Fabric: Non-biodegradable, woven; Mirafi-HP570 manufactured by TenCate. www.tencate.com

B. Substitutions: See Section 016000 - Product Requirements.

2.03 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. See Section 312200 - Grading for additional requirements.

D. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify subgrade surface to a depth of 6 inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Concrete Fill Type S1 Fill Type A1 or Fill Type A2 as directed by Architect.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

H. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Fill with concrete.
   2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.

J. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, footings, slabs-on-grade, footings, footings, similar construction, and footings: 95 percent of maximum dry density.
   2. At other locations: 90 percent of maximum dry density.

K. Reshape and re-compact fills subjected to vehicular traffic.

L. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. At Foundation Walls and Footings:
   1. Use Fill Type S1.
   2. Compact each lift to 95 percent of maximum dry density on both sides of foundation walls and footings.
   3. Do not backfill against unsupported foundation walls.
   4. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

C. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:
   1. Drainage fill and geotextile fabric: Section 334100 - Subdrainage.
   2. Cover drainage fill with Fill Type A3.

D. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
   1. Bedding for under 3 Inch diameter: Use Fill Type A7.
   2. Bedding for 3 Inch diameter and over: Use Fill Type A4.
   3. Cover with Fill Type S1.

E. At Lawn Areas:
   1. Use Fill Type S1.
   2. See Section 312200 - Grading for topsoil placement.

F. At Planting Areas Other Than Lawns and Planter Boxes:
   1. Use Fill Type S1.
   2. See Section 312200 - Grading for topsoil placement.

G. Under Monolithic Paving and Monolithic Paver Setting Beds:
   1. Compact subsoil to 95 percent of its maximum dry density before placing fill.
   2. Use Fill Type S1.
   3. See Section 321123 - Aggregate Base Courses for aggregate base course placed over fill.

3.05 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

B. Top Surface of Filling Under Paved Areas: Plus or minus 1/2 inch from required elevations.

3.06 CLEANING

A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 312500
EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Permanent erosion and sediment control.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Concrete for permanent erosion control structures indicated on drawings.

B. Section 312323 - Fill: Filling and compaction.

C. Section 313700 - Riprap: Stabilization using riprap.

D. Section 321123 - Aggregate Base Courses: Aggregate base course.

E. Section 329223 - Sodding: Permanent turf for erosion control.

1.03 REFERENCE STANDARDS

A. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

B. ASTM D5338 - Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials Under Controlled Composting Conditions, Incorporating Thermophilic Temperatures.

C. ASTM D7322/D7322M - Standard Test Method for Determination of Erosion Control Product (ECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions.

D. ASTM D7367 - Standard Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting.

E. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit.

F. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control.

G. USDA TR-55 - Urban Hydrology for Small Watersheds; USDA Natural Resources Conservation Service.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Maintenance Instructions: Provide instructions covering inspection and maintenance for preventive measures that must remain after Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Comply with requirements of EPA (NPDES) for erosion and sedimentation control, as specified by the NPDES, for Phases I and II, and in compliance with requirements of Construction General Permit (CGP), whether the project is required by law to comply or not.

B. Comply with more stringent requirements of St. Louis County Erosion and Sedimentation Control Manual.

C. Runoff Calculation Standard for Urban Areas: USDA TR-55.

2.02 ACCESSORY MATERIALS

A. Fill Material: See Section 312323.

B. Sod for Permanent Cover: Cultivated grass sod, type as indicated; with strong fibrous root system, free of stones, burned or bare spots.

C. Plants for Permanent Cover: Specie and sizes identified in plant schedule, grown in climatic conditions similar to those in locality of the work.

D. Crushed Stone and Gravel: See Section 321123 for aggregate.

E. Riprap: See Section 313700.

F. Concrete: See Section 033000.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

B. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish documentation required to obtain applicable permits.

1. Obtain and pay for permits and provide security required by authority having jurisdiction.

C. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

3.03 FIELD QUALITY CONTROL

A. Provide analysis of topsoil fill; see Section 014000.

3.04 INSTALLATION

A. Hydroseeding: Apply seeded slurry with a hydraulic seeder at a rate of 275 lbs per acre evenly in two intersecting directions.

B. Do not seed areas in excess of that which can be mulched on same day.

C. Immediately following seeding, apply mulch to a thickness of 1/8 inch. Maintain clear of shrubs and trees.

D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.

E. Following germination, immediately reseed areas without germinated seeds that are larger than 4 by 4 inches.

3.05 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

3.06 CLEAN UP

A. Clean out sediment control structures that are to remain as permanent measures.

END OF SECTION

SECTION 321123
AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

1.02 RELATED REQUIREMENTS

A. Section 312200 - Grading: Preparation of site for base course and topsoil fill at areas adjacent to aggregate base course.

B. Section 312316.13 - Trenching: Compacted fill over utility trenches under base course.

C. Section 312323 - Fill: Compacted fill under base course.

D. Section 321216 - Asphalt Paving: Binder and finish asphalt courses.

E. Section 321313 - Concrete Paving: Finish concrete surface course.

1.03 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.

D. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

E. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Aggregate Composition Test Reports: Results of laboratory tests on proposed materials.

D. Compaction Density Test Reports by Owner's Testing Agency.

1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate where directed by Owner.

C. Aggregate Storage, General:
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate Type A1: Coarse aggregate, conforming to County of St. Louis Department of Highways and Traffic standard specification section 1007 - Aggregate Base Material, Type 5.
   1. Graded in accordance with ASTM C 136, within the following limits:
      a. 1 inch sieve: 100 percent passing.
      b. 1/2 inch sieve: 90 to 60 percent passing.

c. No. 4 sieve: 60 to 35 percent passing.
d. No. 30 sieve: 35 to 10 percent passing.
e. No. 200 sieve: 15 to 0 percent passing.
f. The fraction passing the No. 40 sieve shall have a maximum plasticity index of 6.

B. Aggregate Type A3: Coarse aggregate, conforming to County of St. Louis Department of Highways and Traffic standard specification section 1009 - Aggregate For Drainage, Grade 3.
1. Graded in accordance with ASTM C 136, within the following limits:
a. 1 inch sieve: 100 percent passing.
b. 3/4 inch sieve: 100 to 85 percent passing.
c. 3/8 inch sieve: 55 to 15 percent passing.
d. No. 4 sieve: 10 to 0 percent passing.

2.02 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements for general requirements for testing and analysis of aggregate materials.

B. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

A. Place aggregate in maximum 6 inch layers and roller compact to specified density.

B. Level and contour surfaces to elevations and gradients indicated.

C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/2 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation From Design Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements for general requirements for field inspection and testing.

B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167, ASTM D3017, or ASTM D6938.

C. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Frequency of Tests: 1 test for each lift for each 5 000 s.f. of area.

F. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade and paving.

3.06 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 321216
ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Double course bituminous concrete paving.

1.02 RELATED REQUIREMENTS

1.03 PRICE AND PAYMENT PROCEDURES

A. The Contractor shall be allowed to make a claim for adjustment to the Contract Sum for any plant mix bituminous base, plant mix bituminous pavement, and plant mix bituminous surface leveling placed if the Missouri Department of Transportation (MODOT) Asphalt Price Index increases by more than 10 percent from the monthly Asphalt Price Index of the month the project was bid.
   1. The Owner will issue a Change Order based upon the approved claim made by the Contractor, as defined and calculated below, for the applicable Work completed during each month except for Work on which the Contractor is being charged liquidated damages, due to working beyond the project Substantial Completion Date.
      a. In this case, the "D" value used for the price adjustment will be either the last "D" value prior to the date that liquidated damage assessment began or the current monthly "D" value, whichever is lower.
      b. If the Contractor is being charged liquidated damages due to the Work progressing beyond the project Substantial Completion Date and the current months “D” value results in a credit to the Owner, then the current monthly "D" value will be used.

B. The Owner will issue a credit Change Order for adjustment to the Contract Sum for any plant mix bituminous base, plant mix bituminous pavement, and plant mix bituminous surface leveling placed if the Missouri Department of Transportation (MODOT) Asphalt Price Index decreases by more than 10 percent from the monthly Asphalt Price Index of the month the project was bid.
   1. The Contractor shall cooperate with the Owner and provide any requested information to assist in determining the correct quantities to be used in calculating the credit Change Order.

C. The Asphalt Price Index will be obtained from the MODOT website: http://www.modot.org/business/contractor_resources/bid_opening_info/bidGenInfo.shtml

D. To determine the adjustment for any asphalt cement containing material specified in this section the following formula will be used:
   1. A = (B x C) x (D-E)

E. Where:
   1. A = Contract adjustment amount for asphalt mix placed during monthly Asphalt Price Index period
   2. B = Tons of asphalt mix placed during the monthly Asphalt Price Index period
   3. C = % of virgin asphalt binder as listed in the job mix formula in use
   4. D = Asphalt Price Index, as published by MODOT for the month prior to the month of mix placement (e.g., if asphalt material placed in July, use Price Index listed for June)
   5. E = Asphalt Price Index, as published by MODOT for the month prior to the letting (e.g., if project bid in February, use Price Index listed for January)

F. The contract adjustment will be applied to the actual amount of asphalt binder used by the Contractor for all asphalt items.

G. The percentage of virgin asphalt as shown in the submitted and accepted job mix formula for the Project will be the basis for adjustments for any asphalt mix type placed on the Project during the monthly index period.

H. This adjustment will not extend to any effective asphalt obtained from the use of Recycled Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS) or both will not be eligible for adjustment.

1.04 REFERENCE STANDARDS

A. AI MS-2 - Asphalt Mix Design Methods.

B. AI MS-19 - Basic Asphalt Emulsion Manual.

C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.

1.05 SUBMITTALS

A. Product Data: Submit product information and mix design to Owner.

B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with County of St. Louis Department of Highways and Traffic standards.

B. Mixing Plant: Complying with State of Missouri Highways standard.

C. Obtain materials from same source throughout.

1.07 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

B. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 PRODUCTS

2.01 MATERIALS

A. Crack Filler/Sealant: Sealant material shall be in accordance with County of St. Louis Department of Highways and Traffic standard specifications, Section 1057.5, Joint and Crack Sealer, Hot-Poured Elastic Type.

B. Tack Coat: Emulsified asphalt in accordance with County of St. Louis Department of Highways and Traffic standard specifications, Section 407 - Tack Coat.

2.02 ASPHALT PAVING MIXES

A. Use dry material to avoid foaming. Mix uniformly.

B. Type X Binder Course: In accordance with County of St. Louis Department of Highways and Traffic standard specifications, Section 405 - Bituminous Pavements and Base.

C. Type C Overlay Course: In accordance with County of St. Louis Department of Highways and Traffic standard specifications, Section 405 - Bituminous Pavements and Base.

D. Type C Binder Course: In accordance with County of St. Louis Department of Highways and Traffic standard specifications, Section 405 - Bituminous Pavements and Base.

E. Type D Wearing Course: In accordance with County of St. Louis Department of Highways and Traffic standard specifications, Section 405 - Bituminous Pavements and Base.

F. Mix Temperature: Not less than 200 degrees F at time of placement.

PART 3 EXECUTION

3.01 EXAMINATION

A. Contractor shall contact the Owner to arrange an inspection of the crack repair by the Owner and Contractor prior to placing the tack coat and overlay.

3.02 PREPARATION - CRACK REPAIR

A. Cracks 3/8 inch wide or less:
   1. Remove and dispose of all loose debris in crack.
   2. Place pavement repair membrane in accordance with requirements of Section 320117.
   3. Apply tack coat in preparation for single course overlay.

B. Cracks over 3/8 inch wide:
   1. Mill existing asphalt pavement along entire length of crack.
      a. Width 18 inches.
         1) Tolerance: Centered on crack within 6 inches +/-.
      b. Depth 2 inches.
         1) Tolerance: Within 1/4 inch +/-.
   2. Remove and dispose of all loose debris in crack and milled channel.
   3. Fill crack and milled channel with crack filler/sealant material to match finished grade of adjacent existing asphalt pavement.
   4. Place pavement repair membrane over each joint between the existing asphalt pavement and the milled channel filled with crack filler/sealant material in accordance with the requirements of Section 320117.
   5. Apply tack coat in preparation for single course overlay.

3.03 PREPARATION - TACK COAT

A. Apply tack coat in accordance with County of St. Louis Department of Highway and Traffic standard specifications, Section 407 - Tack Coat.

B. Apply tack coat on asphalt surfaces to receive overlay at uniform rate of 0.05 gal/sq yd.

C. Apply tack coat to contact surfaces of existing asphalt cold joints, concrete curbs, and concrete curb and gutters at uniform rate of 0.05 galy/sq yd.

3.04 PLACING ASPHALT PAVEMENT - SINGLE COURSE OVERLAY

A. Install Work in accordance with County of St. Louis Department of Highways and Traffice standards.

B. Place asphalt within 24 hours of applying tack coat.

C. Place to thickness recommended in Geotech report.

D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

E. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.05 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install Work in accordance with County of St. Louis Department of Highways and Traffice standards.

B. Place asphalt within 24 hours of applying primer or tack coat.

C. Place asphalt to thickness recommended in Geotech report.

D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

E. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.06 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Install Work in accordance with County of St. Louis Department of Highways and Traffice standards.

B. Place asphalt binder course to thickness recommended in Geotech report.

C. Place asphalt wearing course within two hours of placing and compacting binder course.

D. Place asphalt wearing course to thickness recommended in Geotech report.

E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

F. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.07 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

C. Variation from True Elevation: Within 1/2 inch.

3.08 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for quality control.

B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.09 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 2 days or until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 321313
CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete sidewalks, stair steps, and vertical curbs.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: retaining walls .

B. Section 312200 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.

C. Section 321123: Aggregate base course.

D. Section 321723.13 - Painted Pavement Markings: Pavement markings.

E. Section 321726 - Tactile Warning Surfacing: Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide.

B. ACI 301 - Specifications for Concrete Construction.

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

D. ACI 305R - Guide to Hot Weather Concreting.

E. ACI 306R - Guide to Cold Weather Concreting.

F. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

G. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

H. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.

I. ASTM C150/C150M - Standard Specification for Portland Cement.

J. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

K. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.

L. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

M. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.

N. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.

O. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types).

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Submit proposed concrete mix design test reports.

C. Product Data: Provide data on joint filler, admixtures, and curing compound.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Form Materials: Conform to ACI 301.

B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
   1. Thickness: 3/4 inch.

2.02 REINFORCEMENT

A. Steel Welded Wire Reinforcement: Plain type, ASTM A1064/A1064M; in flat sheets; galvanized.

2.03 CONCRETE MATERIALS

A. Obtain cementitious materials from same source throughout.

B. Cement: ASTM C150/C150M, Normal - Type I Portland cement, gray color.

C. Fine and Coarse Mix Aggregates: ASTM C33/C33M, Meramec sand only (lignite free).

D. Fly Ash: ASTM C618, Class C or F.

E. Calcined Pozzolan: ASTM C618, Class N.

F. Silica Fume: ACI 211.1.

G. Water: Clean, and not detrimental to concrete.

H. Air-Entraining Admixtures: ASTM C260/C260M.

2.04 ACCESSORIES

A. Joint Sealer: Self-leveling, one part polyurethane in accordance with ASTM C920, Type S, Grade P, Use T.
   1. Acceptable Product: Sonneborn Sonolastic SL1.
   2. Substitutions: See 016000 - Product Requirements.

B. Reinforcement Accessories:
   1. Chairs, Bolsters, Bar Supports, Sacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   2. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

2.05 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Concrete Strength: Establish required average strength for concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Reducing and Accelerating admixtures will be allowed at the discretion of the Architect and only after review and approval of product information submittal by Contractor. Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

D. Concrete Properties:
   1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 4,000 psi.
   2. Total Air Content: minimum 5 percent, determined in accordance with ASTM C 173/C 173M.
   3. Maximum Slump: 4 inches.
   4. Maximum Aggregate Size: 1 inch.

2.06 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted granular base or existing asphalt surface is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

C. Field Survey
   1. Include in the scope of work for the concrete overlay a field survey of the existing surface elevations to assure that the final overlay is installed to a minimum thickness of 4 inches and that water will drain away from the building sturctures and towards the existing drainage structures.
   2. Include in the scope of work additional concrete material to compensate for the undulations of the existing surfaces to receive the concrete overlay as required to maintain a minimum of 4 inches of thickness.

3.02 SUBBASE

A. See Section 321123 - Aggregate Base Courses for construction of base course for work of this Section.

3.03 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole, handhole, catch basin, and handhole frames with oil to prevent bond with concrete pavement.

C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.04 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

A. Place reinforcement at midheight of slabs-on-grade. Utilize Chairs, Bolsters, Bar Suppirts, Spacers sized and shaped for adequate support of reinforcement during concrete placement.

B. Interrupt reinforcement at expansion joints.

3.06 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

3.07 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Do not place concrete when base surface is wet.

C. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

D. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

E. Place concrete to pattern indicated.

3.08 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Place 3/4 inch wide expansion joints at maximum of 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
   1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
   2. Secure to resist movement by wet concrete.

C. Provide sawn joints.
   1. At maximum 5 feet intervals on sidewalks and in pattern indicated.
   2. At pattern indicated on paved areas other than sidewalks.
   3. Between sidewalks and curbs.
   4. Between curbs and pavement.

D. Provide keyed joints as indicated.

E. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

3.09 FINISHING

A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

B. Curbs and Gutters: Light broom, texture parallel to pavement direction.

3.10 JOINT SEALING

A. Place Joint Sealer after a minimum of 28 days or in accordance with manufacturer's instructions over all joints containing Joint Filler.

3.11 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

B. Maximum Variation From True Position: 1/4 inch.

3.12 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
   1. Provide free access to concrete operations at project site and cooperate with appointed firm.
   2. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

B. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
   1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
   2. Perform one slump test for each set of test cylinders taken.

C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.13 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian or vehicular traffic over pavement for 7 days minimum after finishing.

END OF SECTION

SECTION 321723.13
PAINTED PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Parking lot markings, including parking bays, crosswalks, arrows, and curb markings.

B. Roadway lane markings and crosswalk markings.

1.02 RELATED REQUIREMENTS

A. Section 321216 - Asphalt Paving.

1.03 REFERENCE STANDARDS

A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association.

B. MPI (GPS-1 and GPS-2) - Master Painters Institute Approved Products Standards; Master Painters and Decorators Association; current edition, www.paintinfo.com.

C. FHWA MUTCD - Manual on Uniform Traffic Control Devices.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Certificates: Submit for each batch of paint stating compliance with specified requirements for meeting MPI GPS-1 and GPS-2.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MATERIALS

A. Line and Zone Marking Paint: MPI No. 97 Latex Traffic Marking Paint meeting requirements of MPI GPS-1 and GPS-2; color(s) as indicated.
   1. Roadway Markings: As required by authorities having jurisdiction or as indicated on drawings.
   2. Parking Lots: White or as indicated on drawings.
   3. Handicapped Symbols: Blue.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
   2. Completely remove rubber deposits, existing paint markings, and other coatings adhering to the pavement, by scraping, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.
   3. Sandblasting: Use equipment of size and capacity necessary, providing not less than 150 cfm of air at pressure not less than 90 psi at each nozzle used.

C. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

D. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

E. Temporary Pavement Markings: When required or directed by Architect, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
   1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
   2. At Contractor's option, temporary marking tape may be used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Owner.

3.03 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Comply with FHWA MUTCD manual (http://mutcd.fhwa.dot.gov) for details not shown.

E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
   1. Apply paint in one coat only.
   2. Wet Film Thickness: 0.015 inch, minimum.
   3. Length Tolerance: Plus or minus 3 inches.
   4. Width Tolerance: Plus or minus 1/8 inch.

G. Roadway Traffic Lanes: Use suitable mobile mechanical equipment that provides constant agitation of paint and travels at controlled speeds.
   1. Conduct operations in such a manner that necessary traffic can move without hindrance.
   2. Place warning signs at the beginning of the wet line, and at points well in advance of the marking equipment for alerting approaching traffic from both directions. Place small flags or other similarly effective small objects near freshly applied markings at frequent intervals to reduce crossing by traffic.
   3. If paint does not dry within expected time, discontinue paint operations until cause of slow drying is determined and corrected.

4. Skip Markings: Synchronize one or more paint "guns" to automatically begin and cut off paint flow; make length of intervals as indicated.
5. Use hand application by pneumatic spray for application of paint in areas where a mobile paint applicator cannot be used.

H. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
1. Mark the International Handicapped Symbol at indicated parking spaces.
2. Hand application by pneumatic spray is acceptable.

I. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.04 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.

F. Replace removed markings at no additional cost to Owner.

END OF SECTION

SECTION 329223
SODDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Fertilizing.

D. Sod installation.

E. Maintenance.

1.02 RELATED REQUIREMENTS

A. Section 312200 - Grading: Topsoil material.

B. Section 312200 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.

1.03 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 REFERENCE STANDARDS

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Certificate: Certify grass species and location of sod source.

1.06 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience in hardiness zone 5 through 7.

1.07 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver sod in rolls. Protect exposed roots from dehydration.

B. Do not deliver more sod than can be laid within 24 hours.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod: TPI (SPEC), Certified Turfgrass Sod quality; cultivated grass sod; type indicated below; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft. Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
   1. Tall Fescue Grass Type: 100 percent.
   2. Thickness: "Thin" sod, minimum 1/2 inch and maximum 1 inch topsoil base.
   3. Cut sod in area not exceeding 1 sq yd.
   4. Machine cut sod and load on pallets in accordance with TPI (SPEC) Guidelines.

B. Topsoil: Type S2 as specified in Section 312200 - Grading.

C. Fertilizer: recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, to the following proportions:
   1. Nitrogen: 12 percent.
   2. Phosphoric Acid: 12 percent.
   3. Soluble Potash: 12 percent.

D. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

2.02 ACCESSORIES

A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION

A. Prepare subgrade in accordance with Section 312200 - Grading.

B. Place topsoil in accordance with Section 312200 - Grading.

3.03 FERTILIZING

A. Apply fertilizer at a rate of 2.5 lbs per 1 000 sf.

B. Apply after smooth raking of topsoil and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Lightly water to aid the dissipation of fertilizer.

3.04 LAYING SOD

A. Planting Season: March 15 through October 15.
   1. Sodding must be completed within planting season.

B. Moisten prepared surface immediately prior to laying sod.

C. Lay sod within 24 hours after harvesting to prevent deterioration.

D. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

E. Where new sod adjoins existing grass areas, align top surfaces.

F. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch below top of hard surface.

G. On slopes 4 inches per foot and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.

H. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

I. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.05 MAINTENANCE

A. Provide maintenance at no extra cost to Owner; Owner will pay for water used from existing water system on site.

B. Provide maintenance of sodded areas for two months from date of sod installation or until sod has taken root. Notify Owner one-week prior to end of watering period.

C. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

D. Neatly trim edges and hand clip where necessary.

E. Immediately remove clippings after mowing and trimming.

F. Water to prevent grass and soil from drying out.

G. Roll surface to remove irregularities.

H. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

I. Immediately replace sod to areas that show deterioration or bare spots.

J. If Contractor chooses to delay planting due to weather conditions, Contractor assumes responsibility for erosion control and repair to landscape grading per requirements of Section 312200 - Grading.

END OF SECTION

SECTION 334211
STORMWATER GRAVITY PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stormwater drainage piping.

B. Stormwater pipe accessories.

1.02 RELATED REQUIREMENTS

A. Section 312316.13 - Trenching: Excavating, bedding, and backfilling.

B. Section 334230 - Stormwater Drains.

1.03 REFERENCE STANDARDS

A. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

B. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

C. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories.

C. Field Quality Control Submittals: Document results of field quality control testing.

D. Project Record Documents:
   1. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 REGULATORY REQUIREMENTS

PART 2 PRODUCTS

2.01 STORMWATER PIPE MATERIALS

A. Plastic Pipe: ASTM D3034, SDR 35, Type PSM, Poly Vinyl Chloride (PVC) material; inside nominal diameter as indicated on drawings, bell and spigot style solvent sealed joint end.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

B. Substitutions: See Section 01 6000 - Product requirements.

2.03 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 312316.13 - Trenching.

B. Cover: As specified in Section 312316.13 - Trenching.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 312316.13 - Trenching for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with bedding Fill Type A5 or A6 as appropriate for pipe size, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

3.03 INSTALLATION - SMALL YARD DRAINS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Assemble yard drain in accordance with manufacturer's instructions.

C. Establish elevations and pipe inverts for inlets and outlets as indicated on drawings.

D. Install to elevation indicated.

E. Install grate.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 014000 - Quality Requirements.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
   1. Infiltration Test: Test in accordance with Metropolitan St. Louis Sewer District standards.
   2. Deflection Test: Test in accordance with Metropolitan St. Louis Sewer District standards.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 334230
STORMWATER DRAINS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Precast concrete catch basins.

B. Prefabricated drop inlets.

C. Frames and grates.

1.02 RELATED REQUIREMENTS

A. Section 312316 - Excavation.

B. Section 312323 - Fill.

C. Section 334211 - Stormwater Gravity Piping.

1.03 REFERENCE STANDARDS

A. AASHTO HB - Standard Specifications for Highway Bridges.

B. ASTM C478/C478M - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections.

C. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.

D. ASTM C1634 - Standard Specification for Dry-Cast Concrete Facing Brick and Other Concrete Masonry Facing Units.

1.04 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Weight rating for catch basins, drop inlets, trench drains, and frame and grates.

C. Shop Drawings: Indicate stack assembly, invert elevations, opening sizes, and pipe angles.

D. Manufacturer's Installation Instructions: Indicate special procedures for assembly.

E. Project Record Documents:
   1. Record invert elevations of catch basins, drop inlets, and trench drains.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

PART 2 PRODUCTS

2.01 CATCH BASINS

A. Weight Rating: As specified on the plans.

B. Precast Concrete Catch Basins: Comply with ASTM C478/C478M, reinforced.
   1. Wall Thickness: 6 inches (152 mm).
   2. Base Thickness: 12 inches (305 mm).
   3. Reinforcement: Formed steel wire, galvanized finish, wire diameter as indicated on drawings.
   4. Joint Sealant: Comply with ASTM C990.

C. Grade Adjustments:
   1. Concrete Bricks: ASTM C1634 or ASTM C55 Grade N, cored, normal weight; 4 by 8 by 3 inches.

D. Frames and Grates: As specified on the plans.

2.02 DROP INLETS

A. Weight Rating: As specified on the plans.

B. Prefabricated Drop Inlet: As specified on the plans.

C. Frames and Grates: As specified on the plans.

2.03 ACCESSORIES

A. Steps: Formed galvanized steel rungs; 3/4 inch diameter. Formed integral with manhole sections.

PART 3 EXECUTION

3.01 EXCAVATION AND FILL

A. Hand trim excavation for accurate placement to indicated elevations.

B. Backfill with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION

A. Establish elevations and pipe inverts for inlets and outlets as indicated in drawings.

B. Precast Concrete Catch Basins:
   1. Place base section plumb and level.
   2. Install joint sealant uniformly around section lip.

C. Prefabricated Drop Inlets, Trench Drains, or Slot Drains:
   1. Place base section plumb and level.
   2. Install according to manufacturer's instructions.

D. Grade Adjustments:
   1. Lay brick or masonry units uniformly on mortar bed with full head joints, running bond. Top with mortar, plumb and level.
   2. Place adjacent materials tight and smooth following design grades.

E. Frames and Grates:
   1. Place frame plumb and level.
   2. Mount frame on prefabricated drop inlets or trench drains according to manufacturer's instructions.
   3. Place grate in frame securely.

END OF SECTION