rosstarrant architects

Simpson County CTE Improvements & Alternative School Addition

Simpson County Board of Education
Franklin, Kentucky

RTA 23066
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Project Manual

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Architect
RossTarrant Architects, Inc.
p 859.254.4018

Structural Engineer
BFW, Inc.
p 217.530.4283

Mechanical & Electrical Engineer
Marcum Engineering, LLC
p 270.444.9274

Construction Manager
Alliance Corporation
P 270.651.8848

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SECTION 017300
CUTTING AND PATCHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Related Sections include the following:
1. Division 1 Section "Coordination" for demolition of selected portions of the building for alterations.
2. Division 2 Section " Selective Structure Demolition" for cutting and patching procedures for selective demolition operations.
3. Divisions 2 through 28 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
   a. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 20 and 28 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.03 DEFINITIONS

A. Cutting: Removal of existing construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.04 SUBMITTALS

A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used and firms or entities that will perform the Work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.05 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

D. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

PART 2 PRODUCTS

2.01 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas..

3.03 PATCHING AND REPAIRS

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

B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
1. Fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to manufacturer's printed recommendations.

C. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

D. Patch and repair floor and wall surfaces in the new space where demolished walls or partitions extend from one finished area into another. Provide a flush and even surface of uniform color and appearance.
1. Closely match texture and finish of existing adjacent surface.
2. Patch with durable seams that are as invisible as possible. Comply with tolerances.

3. Where patching smooth painted surfaces, extend final paint coat over entire unbroken surface containing the patch after the surface has received primer and second coat.
4. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
5. Inspect and test patched areas to demonstrate integrity of the installation, where feasible.

E. Walls: Existing penetrations and openings due to the removal of existing communications, data, life safety, electrical, HVAC, sprinkler, or plumbing systems are to be filled and patched as follows:
1. Above New Ceiling Heights:
   a. Existing through-wall penetrations above new ceiling height 4" diameter/square or less, patch with solid, permanent fill material flush with adjacent wall surface.
   b. Existing through-wall penetrations above new ceiling height from 4" diameter/square to approximately 1'-0" x 1'-0" diameter/square. Fill opening with sound attenuation blankets and attach 5/8" gypsum board to both sides of the adjacent wall surface to close opening.
   c. Existing through-wall penetrations above new ceiling height 1'-0" x 1'-0" diameter/square or larger in an existing framed wall. Frame opening with metal studs @ 12" on center. Fill space between studs with sound attenuation blankets and attach 5/8" gypsum board to both sides of the adjacent wall surface to close opening.
   d. Existing penetrations located above new ceiling height 1'-0" x 1'-0" diameter/square or larger in an existing CMU, or structural clay tile wall. Infill existing opening with CMU. Toothing into existing bond pattern is not required at above ceiling locations.
2. Below New Ceiling Heights:
   a. Existing through-wall penetrations below new ceiling height 4" diameter/square or less. Patch with solid, permanent fill material. New plaster finish to match existing plaster surface texture, if applicable.
   b. Existing through-wall penetrations below new ceiling height 4" diameter/square to approximately 1'-0" x 1'-0" diameter/square. Fill opening with sound attenuation blankets and inset 5/8" gypsum board on both sides of the wall to close opening. New plaster finish to match existing plaster surface texture, if applicable.
   c. Existing through-wall penetrations below new ceiling height 1'-0" x 1'-0" diameter/square or larger in an existing framed wall. Frame opening with metal studs @ 12" on center. Fill space between studs with sound attenuation blankets and attach 5/8" gypsum board to both sides of the adjacent wall surface to close opening. New plaster finish to match existing plaster surface texture, if applicable.
   d. Existing through-wall penetrations located below new ceiling height 1'-0" x 1'-0" diameter/square or larger in an existing CMU or structural clay tile wall. Infill existing opening with CMU, or structural clay tile set back from the existing wall surface to allow new plaster finish to be installed in specified thickness and to match existing surface texture, if applicable.
   e. Existing through-wall penetrations located below new ceiling height 1 inch diameter/square or larger in walls with exposed CMU, or glazed structural tile units. Infill existing opening with CMU, or glazed structural tile unit, to match existing surface texture and bond pattern. Remove whole masonry unit(s) and tooth-in to match existing bond pattern.
   f. Existing through-wall penetrations in rated wall assemblies to receive fire rated gypsum board, fire blankets and fire resistant caulk at the intersection of the existing wall and fire rated gypsum or rated CMU wall construction. Provide new plaster finish to match existing plaster surface texture if applicable.
3. Partial Wall Openings/Non-Through-Wall Penetrations Below New Ceiling Heights:
   a. Wall openings left behind after demolition of fully or partially recessed electrical panels and other electrical items, communications, data, life safety, HVAC, sprinkler, or plumbing are to receive infill materials to match the surface of the wall.

1) Existing CMU/Glazed Structural Clay Tile Walls: Toothing into existing CMU, or glazed structural tile, matching bond pattern is required at below ceiling locations.
   (a) Tooth-in with whole units.
2) Existing Framed Walls: Frame opening with metal studs @ 12" on center. Fill space between studs with sound attenuation blankets and attach 5/8" gypsum board to exposed side of the adjacent wall surface to close opening.

b. Set back infill material as necessary to provide new plaster finish to match existing plaster surface texture if applicable.

F. Floors: Existing penetrations and openings due to the removal of existing communications, data, life safety, electrical, HVAC, sprinkler, or plumbing systems are to be filled and patched as follows:
1. Concrete slab on grade: Remove or grind flush with existing slab surface any cast in place steel pipe support brackets, flange, collar or anchor. Patch with concrete to match structural characteristics of new slabs on grade. Coordinate with final flooring finish thickness for final fill elevation.
2. Elevated slabs: Remove or grind flush with existing slab surface any cast in place steel pipe support brackets, flange, collar or anchor. Provide 16 gage galvanized metal plate secured to the underside of the existing deck. Patch with concrete to match structural characteristics of new elevated concrete slabs. Coordinate with final flooring finish thickness for final fill elevation. Contractor option to use Hole Mole Core Hole Filling System: www.holemoleconcrete.com

3.04 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.

END OF SECTION 017300

SECTION 024119
SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Selective demolition of built site elements.

B. Selective demolition of building elements for alterations purposes.

C. Selective demolition of existing utilities and utility structures.

D. Demolition of the existing roofing and associated roof items.

E. Patching and repairs of existing elements to remain.

1.02 RELATED SECTIONS

A. Section 017300 - Cutting and Patching: Repairs to existing surfaces.

B. Section 311000 - Site Clearing: Vegetation and existing debris removal.

C. Section 312200 - Grading: Topsoil removal.

D. Divisions 21 through 28 Sections for or relocating of site mechanical and electrical items.

1.03 REFERENCES

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2004.

1.04 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.

B. Remove and salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.

D. Existing to remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled. Protect construction indicated to remain against damage and soiling during selective demolition.

1.05 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

1.06 SUBMITTALS

A. Site Plan: Showing:
   1. Areas for temporary construction and field offices.

B. Selective Demolition Plan: Submit selective demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of selective demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Indicate starting and ending dates for each activity.
   3. Identify demolition firm and submit qualifications.

4. Include a summary of safety procedures.
5. Coordination for shutoff, capping, and continuation of utility services.
6. Locations of temporary protection and means of egress.
7. Detailed sequence of selective demolition and removal work to ensure Owner's uninterrupted continuing occupancy of adjacent buildings and partial use of premises.

C. Proposed Enviromental-Protection and Dust-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed location, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

D. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before work begins.

E. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.07 QUALITY ASSURANCE

A. Conference: Conduct conference at Project site to comply with requirements in Division 1 sections. Review methods and procedures related to building demolition including, but not limited to, the following:
1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structures.
3. Review and finalize selective demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review and finalize protection requirements.

1.08 PROJECT CONDITIONS

A. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far a practical.

B. Before building demolition, Owner will remove the following items:
1. Loose furniture, fixtures and equipment

C. 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.

D. Storage or sale of removed items or materials on-site is not permitted.

1.09 HAZARDOUS MATERIALS

A. Hazardous Materials: It is not expected that hazardous material will be encountered in the work.
1. If material suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

1.10 WARRANTY

A. Existing Special Warranty: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
1. Existing roof is currently under warranty:
a. Seaman Corporation/Fibertite Warranty Serial No.: 20230916.
b. Effective date 11/27/2023 through 11/27/2043.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 312200 - Grading

B. Repair Materials: Use repair materials identical to existing materials.

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

PART 3 EXECUTION

3.01 SCOPE

A. Remove portions of existing building as indicated on the drawings.

B. Area of building(s) to be selectively demolished will be vacated and their use discontinued before start of Work.

C. Owner will occupy another area immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
1. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
2. Maintain access to existing walkways, exits, and other adjacent occupied or used facilities.
   a. Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from authorities having jurisdiction.

D. Remove other items indicated, for salvage and relocation.

E. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as required so that required rough grade elevations do not subside within one year after completion.

3.02 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditional are the same as those indicated in Project Record Documents.

C. Inventory and record the condition of items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to the Architect.

E. Survey the condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.

3.03 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. 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. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
   a. Maintain adequate ventilation when using cutting torches.
4. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the lower level.
5. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize

disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

6. Cut or drill from the exposed surface or finished side into concealed surfaces to avoid marring existing finished surfaces.
7. Buildings over one story remove debris from elevated portions by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
    a. Remove structural framing members and lower to ground by method suitable to minimize ground impact or dust generation.
8. 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.
    a. Locate selective demolition equipment throughout the structure and remove debris and materials so as to not impose excessive loads on supporting walls, floors, or framing.
9. Provide, erect, and maintain temporary barriers and security devices.
    a. Comply with requirements in Division 1 Temporary Facilities and Controls.
10. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
11. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
12. Do not close or obstruct roadways or sidewalks without permit.
13. 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.

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

C. Protect existing structures and other elements that are not to be 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.

D. Site Restoration:
1. Staging, Parking and Storage: Restore lawn areas used for staging and storage of construction materials or parking during the project back to their original condition.

E. Removed and salvaged items: Comply with the following:
1. Contractor to remove and salvage the following items:
    a. Culinary lab cooking equipment.
2. Clean salvaged items of dirt and demolition debris.
3. Pack or crate items after cleaning. Identify contents of containers.
4. Store items in a secure area until delivery to Owner.
5. Transport items to Owner's storage area off-site.
    a. Off-site storage located at TBD with Owner.
6. Protect items from damage during transport and storage.

3.04 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; 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. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Prepare selective demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.
1. Refer to Divisions 21 through 28 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.

3.05 SELECTIVE DEMOLITION

A. Drawings showing existing construction and utilities are based on field observation and existing record documents only.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage to structure or interior areas.

C. Protect walls, ceilings, floors, and other existing finish work that are to remain and are exposed during selective demolition operations.

D. Remove existing work as indicated and as required to accomplish new work.
1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete and promptly remove off-site.
2. Concrete: Cut concrete, in small sections, full depth at junctures with construction indicated to remain, using power-driven saw, then remove concrete between saw cuts. Do not use power-driven impact tools.
3. Masonry: Cut masonry, in small sections, at junctures with construction indicated to remain, using power-driven saw, then remove masonry between saw cuts. Do not use power-driven impact tools.
4. Concrete Slabs-on Grade: Saw-cut perimeter of area to be demolished at junctures with construction indicated to remain, then break up and remove, unless otherwise shown to remain.
5. Steel: Dismantle field connections without bending or damaging steel members. Do not use flame cutting torches unless otherwise authorized.
   a. Steel trusses and joists as whole units without dismantling them further.
6. Ceramic, Porcelain and Quarry Floor Tile and Base: Remove tile, grout, mastic, mudset bed, spacers, mesh and lathe in its entirety to leave remaining subfloor and wall surface in clean, smooth condition ready for new flooring material.
   a. Mud/Thick set tile: Remove mud/thickset in its entirety to leave remaining subfloor and wall surface in clean, smooth condition ready for new flooring and fill material.
7. Ceramic, Porcelain Quarry Wall Tile and Base: Remove tile, grout, mastic, spacers, mesh and lathe in its entirety to leave remaining CMU wall surface in clean, smooth condition ready for new wall material.
8. Ceramic, Porcelain Quarry Wall Tile and Base: Remove tile, grout, mastic, spacers, mesh and lathe and backer board in its entirety ready for new backer board installation.
9. Carpet: Remove in large pieces and roll tightly after removing demolition debris, trash, adhesive, tack strips, pad. Remove all adhesives, staples and other carpet securement items in their entirety to leave remaining subfloor in clean, smooth condition ready for new flooring material.

10. Resilient Floor Covering: Remove resilient floor coverings and adhesive according to recommendations of the Resilient Floor Covering Institutes (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings" and Addendum.
    a. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.
11. Gypsum/Drywall Board Ceilings, Soffits and Bulkheads: Remove gypsum/drywall board, suspension hangers, clips, suspension grid system, furring or other stud support system in its entirety so existing ceiling area is ready to receive new ceiling system.
12. HVAC Equipment: Disconnect equipment at nearest fitting connection to services, complete with service valves. Remove as whole units, complete with controls.
13. 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 that are to remain in operation; 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. Verify that abandoned services serve only abandoned facilities before removal.
4. 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 if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch as specified for patching new work.
    a. Patching is specified in Division 1 Section "Cutting and Patching".

G. Roofing Demolition:
1. Remove no more existing roofing than can be covered in one day by new temporary roofing.
2. Coordinate removal of existing roofing with installation of new temporary roofing and existing roof drains to remain. Coordinate repairs of existing roof deck with installation of temporary roofing.
3. Provide water cut-offs, that do not create a water dam, at the end of each day's work.
4. Remove existing roofing material by method to avoid damage to existing substrates.
5. Remove debris from the roof by chute, hoist, or other device that will convey debris to grade level in a controlled descent. Do not throw materials from the roof.
6. Do not traverse re-roofed areas to carry removed materials to chutes; where possible, relocate chutes to areas where demolition is occuring.
7. Provide temporary walkways, as required, to protect existing substrates from damage by roofing operations.
8. See applicable Division 7 Section for new roofing requirements.

3.06 DEBRIS AND WASTE REMOVAL

A. Except for items or materials indicated to be reused, salvaged, and reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Transport demolished materials from Owner's property and legally dispose of them..

C. Transport demolished materials approved for fill and dispose of at designated spoils areas on Owner's property.

D. Do not burn demolished materials on site.

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

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

G. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return to condition existing before start of selective demolition.

END OF SECTION 024119

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 321313 “Concrete Paving” for site construction applications.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture.
1. Concrete mix designs must be submitted a minimum of 15 days prior to the start of the work for engineer approval prior to the placement of concrete. Any adjustments in approved mix designs including changes in admixtures must be submitted in writing to the engineer and testing laboratory for approval prior to use. All mix design submittals shall clearly indicate the use and location of the particular mix.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.
1. The Contractor shall neither use nor reproduce any part of the Design Drawings as part of the Shop Drawings.
2. At least one copy of each approved shop drawings shall be kept available in the Contractor’s field office. Drawings not bearing “Reviewed – No Exceptions” or “Reviewed – Exceptions Noted” stamps by the Engineer shall not be kept on the job site.

1.3 INFORMATIONAL SUBMITTALS

A. Material certificates.

B. Material test reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.6 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1.

1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.
2. ACI 117.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

C. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.4 CONCRETE MATERIALS

A. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I or Type III,.
2. Fly Ash: ASTM C 618, Class F or C.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33/C 33M, graded.

1. Maximum Coarse-Aggregate Size: Not to be larger than one-fifth of the narrowest dimension between sides of forms, one-third the depth of slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C 260/C 260M.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

E. Water: ASTM C 94/C 94M and potable.

2.5 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

2.6 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A, except with maximum water-vapor permeance of 0.01 perms. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.8 RELATED MATERIALS

A. Joint Filler:
1. Expansion joint fillers shall extend the full depth of slab or joint and be of the thickness shown on the drawings. Filler shall be asphalt-impregnated fiberboard conforming to ASTM D1751 for interior work and self-expanding cork board conforming to ASTM D1752 for exterior work.
2. Control joints shall be filled with field molded sealant or filler.
3. Isolation joint fillers shall consist of 1/8 inch wide strips of neoprene, synthetic rubber, or approved substitute, extending the full depth of the slab.

B. Porous Fill:
1. Porous fill under concrete slabs-on-grade shall consist of clean crushed rock, crushed or uncrushed gravel, or other similar free flowing material of such size as will pass a 1" screen with not more than 5 percent passing a No. 4 screen. Porous fill shall contain no earth, clay, or any foreign substances.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

B. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Normal-Weight Concrete:

1. Minimum Compressive Strength: 4000 psi at 28 days.
   a. f'c = 4500 psi @ 28 days - all exposed exterior concrete flat work (i.e., slabs, equipment pads, etc.).
   b. f'c = 4000 psi @ 28 days - all interior concrete (i.e. footings, pedestals, retaining walls, concrete in Insulated Concrete Forms [ICF], etc.).
   c. f'c = 4000 psi @ 28 days - all interior slabs on grade
   d. f'c = 4000 psi @ 28 days - all concrete fill over metal deck.
2. Maximum W/C Ratio: 0.50.
3. Slump Limit: 4 inches (8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture), plus or minus 1 inch.
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Vertical Construction Joints: Joints shall be located within the central third of the span. Any concrete spilling over or through the bulkhead shall be removed at the completion of the pour. All surfaces of the concrete shall have reinforcing extending through the joint. Where not otherwise shown on drawings, provide #4 bars at 12 inch o.c. x 4'-6' long.
2. Horizontal Joints: Horizontal construction joints other than those shown on the drawings will not be permitted unless approved by the Architect.
3. Joint Preparation: Forms shall be removed in time to permit roughening of construction joints of structural members by chipping and wire brushing to remove all loose and foreign material. The joints shall be dampened and the specified bonding compound applied. New concrete shall be placed after the rewettable bonding compound has dried or while the bonding grout or epoxy adhesive is still tacky. The anti-corrosive epoxy cementitious adhesive has a 20-hour open time.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated, or where not specifically shown, provide at maximum 15 feet or 36 times slab thickness, whichever is smaller, for slab on grade. Joints must be aligned and continuous. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Cut joints within 12 hours after finishing. Joints shall be filled with the specified epoxy joint filler once contraction has occurred.

D. Construction Joints in Slabs-on-Grade: Butt joint with dowels shall be provided. For details, refer to typical joint construction detail on the drawings.

E. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 WATERSTOP INSTALLATION

A. Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions.

3.7 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

C. Cold-Weather Placement: Comply with ACI 306.1.

D. Hot-Weather Placement: Comply with ACI 301.

E. Slabs on Grade: Place concrete slabs on grade by the long strip cast method. Refer to ACI 302 and 360 for recommended methods of placement. Maximum outside diameter of pipe or conduit placed in slabs on grade shall be limited to one-third the thickness of the slab. The minimum concrete cover top and bottom shall be one-third the thickness of the slab. Separate parallel pipes to permit concreting between and below them.

F. Rainy Weather Placement: Concrete shall not be placed during rain. Sufficient coverings shall be provided and kept on hand for protection during rainstorms. Prior to placing concrete, wind speed and dew point shall be monitored and recorded to control plastic shrinkage cracking. The guidelines of CACI 318, ACI 305R, and ACI 306R as applicable, shall be followed. The contractor, at a minimum, shall provide wind screens as required to minimize this condition.

3.8 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where exposed to public view:

1. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

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

3.9 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

1. Apply scratch finish to surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.10 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures, for a minimum of 7 days. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. With prior approval of the Engineer, as to method and procedure, all repairs of defective areas shall conform to ACI 301, Section 5.3.7.

3.12 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 033000

SECTION 040100
MAINTENANCE OF MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chemical cleaning of all existing brick surfaces.

1.02 RELATED REQUIREMENTS

A. Section 042000 - Unit Masonry: Brick cleaning for new construction.

B. Section 079005 - Joint Sealants: Installation of sealants.

1.03 SUBMITTALS

A. Product Data: Provide data on cleaning compounds and cleaning solutions.

1.04 QUALITY ASSURANCE

A. Restorer: Company specializing in masonry restoration with minimum five years of documented experience.

B. Source Limitations: Obtain each type of material for masonry restoration from one source with resources to provide materials of consistent quality in appearance and physical properties.

C. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends into surrounding areas.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

1.06 PROJECT CONDITIONS

A. Do not blast clean or use process creating dust, dirt, when wind is over 10 mph.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cleaner:
   1. Manufacturers subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
      a. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements, aesthetics, and formulations of the following:
         1) Prosoco: EnviroKlean EK Restoration Cleaner.
   2. Products by other manfacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect:
      a. Diedrich Technologies, Inc.: www.diedrichtechnologies.com.
      b. Miracle Sealants Company: www.miraclesealants.com.
      c. PROSOCO: www.prosoco.com.
      d. Price Research Limited: www.priceresearchltd.com.

PART 3 EXECUTION

3.01 PREPARATION

A. Protect surrounding elements from damage due to restoration procedures.

B. Separate areas to be protected from sealer areas using means adequate to prevent damage.

C. Mask immediately adjacent surfaces with material that will withstand sealant procedures.

3.02 CLEANING EXISTING MASONRY

A. Cleaning Solution: Utilize masonry washing equipment generating 400-1000 psi with a water flow rate of 6-8 gallons per minute delivered through a 15-45 degree fan spray tip.

3.03 CLEANING

A. Immediately remove stains, efflorescence, or other excess resulting from the work of this section.

B. Remove excess mortar, smears, and droppings as work proceeds and upon completion.

C. Clean surrounding surfaces.

END OF SECTION 040100

SECTION 042000
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete block.

B. Clay facing brick.

C. Mortar and grout.

D. Reinforcement and anchorage.

E. Flashings.

F. Accessories.

G. Installation of embedded items not specified in this section.

H. Masonry Cleaners.

I. Products installed, but not furnished, under this Section include the following:
   1. Steel lintels for unit masonry, furnished under Division 5 Section "Structural Steel Framing".
   2. Sheet metal flashings and manufactured reglets in masonry joints for metal flashing, furnished under Division 7 Section "Roof Specialties".
   3. Hollow-metal frames in unit masonry openings, furnished under Division 8 Section " Steel Doors and Frames".
   4. Wood nailers and blocking built into unit masonry are specified in Division 6 " Rough Carpentry".

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Nailing strips built into masonry.

B. Section 070810 - Exterior Building Enclosure Air Barrier Requirements: Requirements for an airtight building enclosure.

C. Section 071113 - Bituminous Dampproofing: Dampproofing masonry surfaces.

D. Section 072100 - Thermal Insulation: Insulation for cavity spaces.

E. Section 078400 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.

F. Section 079005 - Joint Sealers: Backing rod and sealant at control and expansion joints.

G. Section 081113 - Hollow Metal Doors and Frames: Frame anchoring requirements.

1.03 REFERENCE STANDARDS

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.

B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2008.

C. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

F. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2011.

G. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.

H. ASTM C56 - Standard Specification for Structural Clay Nonloadbearing Tile; 2013.

I. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2014.

J. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.

K. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.

L. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2011.

M. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.

N. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

O. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).

P. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2014.

Q. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

R. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.

S. ASTM C 1019 - Standard Test Method for Sampling and Testing Grout; 2009.

T. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2005.

U. BIA Techical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.

V. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2005.

W. BIA Technical Notes No. 7 - Water Penetration Resistance - Design and Detailing; 2005.

X. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.

Y. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2005.

Z. ASTM E 119 - Standard Test Methods for Fire tests of Building Construction and materials.

AA. Brick Industry Association: Technical Notes on Brick Construction; Current Edition.

AB. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; 1993.

AC. IMIAWC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.

AD. UL (FRD) - Fire Resistance Directory; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings" and adhere to the following specifics regarding masonry pre-installation conference guidelines.

1. The General Contractor/Construction Manager should organize and hold a meeting with the Owner, Architect, General Contractor/Construction Manager, site superintendent, masonry

company owner, masonry foreman, all bricklayers, carriers and any other personnel from the masonry company that will be working at the project site. Also include testing and inspection agency representative, installers of cavity wall insulation, storefront, curtain wall, door and window, installers of steel, joist and deck, installers of mechanical, electrical and plumbing items, installers of other work in and around the masonry that must precede or follow masonry work.

2. Review foreseeable methods and procedures related to masonry work, including but not necessarily limited to the following:
   a. a)Sample and Mock-up Wall Sections:
      1) Size and Location
      2) Products and Detail required
      3) Protection Methods of Sample and Mock-up Wall Sections
      4) Approval Authority and Notification
   b. Site Inspection:
      1) Identity of Responsible Person
      2) Frequency of Inspection
   c. Materials:
      1) Storage & Protection
      2) Delivery Process
   d. Submittals:
      1) Product Certification
      2) Shop Drawing Requirements
      3) Review MEP penetration coordination drawings.
      4) Time Expectation
      5) Testing and Inspection Requirements
   e. Construction Means and Methods:
      1) Hot & Cold Weather Protection
      2) Protection of Work in Process
      3) Material Handling Process
      4) Cleaning Process
   f. Schedule:
      1) Product Availability
      2) Review of Associated Trades Responsibility
   g. Project Closeout:
      1) Punch List Procedure
3. Record (Contractor) discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

1.05 FIELD REQUIREMENTS

A. Protection of Masonry: During construction, cover tops of walls, projections and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
   2. Where one wythe of multiwythe masonry is completed in advance of other wythes, secure cover a of 24 inches down face next to unobstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over wall surface.

2. Protect sills, ledges and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602 and as specified herein.

1. Cold Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
2. Hot Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
    a. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.
3. Cold Weather Construction: When the ambient temperature is within the limits indicated, perform the following construction procedures. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10o F.
    a. 40o F to 32o F:
        1) Mortar: Heat sand or mixing water to produce mortar temperature between 40o F and 120o F at time of mixing.
        2) Grout: Grout does not require heated materials, unless the temperature of materials is below 32o F.
        3) 32o F to 25o F:
            (a) Mortar: Heat mixing water and sand to produce mortar temperatures between 40o F and 120o F; maintain temperature of mortar on boards above freezing.
            (b) Grout: Heat grout materials to produce grout temperature between 70oF and 120o F. Maintain grout above 70oF until used in masonry.
        4) 25o F to 20o F:
            (a) Mortar: Heat mixing water and sand to produce mortar temperatures between 40o F and 120o F; maintain temperature of mortar on boards above freezing.
            (b) Grout: Heat grout materials to produce grout temperature between 40 and 120o F. Maintain grout above freezing until used in masonry. Heat masonry units to 40o F (4o C) prior to grouting.
            (c) Heat both sides of walls under construction to 40oF..
            (d) Use windbreaks or enclosures when wind is in excess of 15 mph.
        5) 20o F and below:
            (a) Mortar: Heat mixing water and sand to produce mortar temperatures between 40o F and 120o F.
            (b) Grout: Heat grout materials to produce grout temperature between 70oF and 120o F. Maintain grout above 70oF until used in masonry.
            (c) Masonry Units: heat masonry units to 40o F.
            (d) Provide enclosure and auxiliary heat on both sides of walls under construction to maintain temperatures within the enclosures above 32o F for a period until mortar sets and water is evaporated from

mix to a point that mortar will not spall or lose effective strength due to freezing.

4. Cold-Weather Protection: When the mean daily temperature is within the limits indicated, provide the following protection:
   a. 40o F to 25o F: Completely cover masonry with weather-resistant membrane for at least 24 hours after construction. Extend coverage time period to 48 hours for grouted masonry.
   b. 25o F to 20o F: Completely cover masonry with weather-resistive insulating blankets or provide enclosure and heat for 24 hours after construction to prevent freezing. Extend coverage time period to 48 hours for grouted masonry. Install wind breaks when wind velocity exceeds 15 mph.
   c. 20o F and below: Provide enclosure and heat to maintain temperatures above 32o F within the enclosure for 24 hours after construction. Extend coverage time period to 48 hours for grouted masonry.
5. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements:
   a. For units with surface temperatures above 32o F, wet with water heated to above 70 o F .
      1) For units with surface temperatures below 32o F, wet with water heated to above 130o F.

1.06 SUBMITTALS

A. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

B. Samples: Submit two samples of decorative block and facing brick units to illustrate color, texture, and extremes of color range.

C. Samples for Verification: For the following:
1. Sample boards or boxes of each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
2. Full-size units for each different exposed masonry unit required, showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.
3. Weep holes/vents in color to match mortar color.
4. Accessories embedded in the masonry.

D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
1. Each type of masonry unit required.
   a. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
3. Each material and grade indicated for reinforcing bars.
4. Each type and size of joint reinforcement.
5. Each type and size of anchor, tie, and metal accessory.

E. MEP Coordination Drawings: CM/GC shall submit coordination drawings of all MEP penetrations, over eight (8) inches in width, through load-bearing and non-bearing masonry walls. These drawings shall indicate the size and location of all penetrations and shall be submited to the Architect/Structural Engineer prior to installation. Submit for review prior to scheduled Masonry Preinstalltion Meeting.

1.07 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. The Owner will employ an independent agency qualified to perform the testing indicated to verify that the masonry meets the required specification per Chapter 17 of the 2015 International Building Code with KY Amendments. The Owner will be responsible to pay for testing during normal hours of business operation or non-overtime hours. Any testing expense incurred due to overtime work will be paid for by the installing Contractor. The installing Contractor shall notify the testing agency at least 24 hours prior to beginning any work that requires testing. Copies of all reports shall be forwarded to the Owner and Architect.
2. Provide continuous inspection to verify compliance of the following:
   a. Cleanliness of grout space prior to grouting.
   b. Placement of grout in reinforced cells.
   c. Preparation of required grout and mortar specimens.
3. Provide periodic inspection to verify compliance of the following:
   a. Proportions of site-prepared mortar or grout.
   b. Construction of mortar joints.
   c. Quantity, size, location, and support of reinforcing steel.
   d. Quantity, size, and placement of horizontal joint reinforcement.
   e. Type, size and location of anchors.
   f. Protection of masonry during cold or hot weather
4. Verify compressive strength of concrete masonry units, mortar, and coarse grout for every 5,000 sq. ft. of surface area as follows:
   a. Three (3) concrete masonry units shall be tested in accordance with ASTM C140.
   b. Six (6) mortar cube specimens shall be tested, three (3) at 7-days and three (3) at 28-days, in accordance with ASTM C109.
   c. Four (4) coarse grout specimens shall be tested, two (2) at 7-days and two (2) at 28-days, in accordance with ASTM C1019.
   d. In lieu of individual tests of masonry units, mortar, and grout, perform one (1) prism test (which consists of three prisms) in accordance with ASTM E447.

B. Fire Rated Assemblies: Conform to applicable code for UL Assembly No. located on the drawings.

C. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.

D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

E. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

1.08 MOCK-UP

A. Construct a masonry wall as a mock-up panel size as provided on the drawings, mock-up to include mortar and accessories, structural backup, flashings, and wall insulation.
1. Mockups: Before installing unit masonry, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects. Build mockups to comply with the following requirements, using materials indicated for the completed Work.
   a. Construct mock-up panel as indicated on the drawing following this section of the specifications.
   b. Locate panels in the locations indicated or, if not indicated, as directed by Architect.
   c. Clean exposed faces of panels with masonry cleaner indicated.
   d. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.

e. Protect approved mockup panels from the elements with weather-resistant membrane.
f. Maintain sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
g. Approval of mockup panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
    1) Approval of mock-up panel does not constitute approval of deviations from the Contract Documents contained in sample panels, unless such deviations are specifically approved by Architect in writing.
h. Demolish and remove mockup panels when directed.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

E. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.

F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.10 MASONRY PROJECT FORMAN/SUPERINTENDENT CERTIFICATION

A. Both the Masonry Subcontractor Project Foremen and the General Contractor Superintendent shall provide a sworn notarized statement to the Owner and the Architect that the through wall flashing has been fully and installed following industry standards for a permanent watertight integrated system. All means, methods, and labor to perform this integration is fully part of this contract.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
    1. Special Shapes: Provide non-standard blocks configured for corners, lintels, headers, control joint edges, jambs, bonding, sash, and other detailed conditions.
        a. Provide bullnose units for outside corners, unless otherwise indicated.
        b. Provide solid units at 45 degree angled corners.
    2. Size (Width): Manufactured to the following dimensions:
        a. 6 inches, 5 5/8" actual.
        b. 8 inches, 7 5/8" actual.
        c. Standard units to have nominal face dimension of 8" x 16" unless otherwise indicated.
    3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi, but as required to achieve the compressive strength of masonry specified in the structural drawings.

4. Non-Load-Bearing and Load-Bearing Units: ASTM C 90, lightweight.
   a. Hollow block, as indicated.
   b. Exposed Faces: Manufacturer's standard color and texture where indicated.
5. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   a. A. C. Krebs Company
   b. Houchens Industries, Inc./Lee Building Products/Meade Block & Stone/Hinkle Block and Masonry/Boyle Block/L. Thorn Company; www.leebp.com
   c. Reading Rock; www.readingrock.com
   d. Oberfields LLC; www.oberfields.com
   e. Wright Concrete and Construction: www.wrightconcrete.com

2.02 CLAY MASONRY UNITS - GENERAL

A. General: Provide shapes indicated and as follows for each form of brick required:
   1. Provide units without cores or frogs and with exposed surfaces finished for ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces.

B. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
   1. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, soldier and sailor courses, and turn-backs at window and door sills, jambs, heads and lintels.
   2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
   3. Provide architectural quality brick with finished ends to match face at exposed exterior corners.

2.03 FACE BRICK

A. Manufacturers: Subject to compliance with requirements, provide one of the following:
   1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      a. Bowerston Shale: Red Brush-Tex, Modular.

B. Products by other manufacturers (listed below) may be considered provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect. Additional acceptable manufacturers provided existing brick can be matched include, but are not limited to the following:
   1. Equivalent brick matches to the basis of design selection are required to be submitted to Architect for review prior to last addendum for approval.
      a. Bowerston Shale: www.bowerstonshale.com
      b. Endicott Clay Products Co: www.endicott.com.
      c. Weinerberger/General Shale Brick: www.generalshale.com.
      d. Weinerberger/General Shale Brick/Meridian Brick LLC; www.meridianbrick.com.
      e. Sioux City Brick :www.siouxcitybrick.com
      f. Belden Brick: www.beldenbrick.com
      g. Glen-Gery Brick: www.glengerybrick.com
      h. McAvoy Brick: www.mcavoybrick.com
      i. Weinerberger/General Shale Brick/Watsontown Brick: www.watsontownbrick.com
      j. Substitutions: See section Division 0; Supplemental Instructions to Bidders; Substitution Request During Bidding form.

C. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 8000 psi.
   2. Initial rate of Absorption: Less than 20g/30 sq. in. per minute when tested per ASTM C 67.

3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. All bricks supplied are to be through the body color.
5. Color and texture to match Architect's sample.
6. Nominal Size: Modular; Field Brick - 3 1/2 to 3 5/8 inches (89 to 92 mm) wide by 2 1/4 inches (57 mm) high by 7 1/2 to 7 5/8 inches (190 to 194 mm) long.

2.04 MORTAR AND GROUT MATERIALS

A. Manufacturer: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   1. Standard mortars:
      a. The Quikrete Companies/Spec Mix Inc.: www.specmix.com
      b. Cemex; Kosmos Cement: www.cemex.com
      c. Heidelberg Cement Group; Lehigh Hanson/Essroc; Brixment:: www.lehighhanson.com
      d. Oldcastle APG/Amerimix Mortar: www.amerimix.com
   2. Moisture-Resistant Admixture: Use for all exterior mortars listed above. Water repellent compound designed to reduce capillarity. Admixture for use in mortar at all exterior concrete masonry, brick facing units or any combination included in the project. Concrete masonry products containing integral water repellant by same and/or different manufacturer listed below is acceptable.
      a. Manufacturer: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
         1) W.R. Grace & Co., Construction Products Division; Dry-Block: www.na.graceconstruction.com
         2) BASF Construction Chemicals; Rheopel Plus: www.masterbuilders.com
         3) RussTech Admixtures, Inc; Russtech Mortarpel-S: www.russtechnet.com

B. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction.
   1. Not more than 0.60 percent alkali.
   2. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207.

D. Ready-Mixed Mortar: Materials, water and aggregate complying with requirements specified in this article, combined with set controlling admixtures to produce a ready-mixed mortar complying with ASTM C 270.

E. Mortar Aggregate: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
   1. Type as required for mortar to match color mortar selected.

F. Water: Clean and potable.

2.05 GROUT MATERIALS

A. Aggregate for Grout: ASTM C 404.

B. Grout: ASTM C 476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
   1. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

C. Refer to structural sheets for additional grout information.

2.06 REINFORCEMENT AND ANCHORAGE

A. Manufacturers of Joint Reinforcement and Anchors:
   1. Subject to compliance with requirements manufacturers offering the following products that may be incorporated into the work include:
      a. Heckmann Building Products: www.heckmannbuildingprods.com
      b. Hohmann & Barnard, Inc (including Dur-O-Wal and Blok-Lok companies): www.h-b.com.
      c. WIRE-BONDwww.wirebond.com/#sle.

B. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420) deformed billet bars; uncoated. Refer to structural drawings for sizes, spacing and placement.

C. Single Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Ladder.
   2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B.
   3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
   4. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      a. Hohmann & Barnard - #220 Ladder Type.

D. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
   1. Type: Ladder, with adjustable ties spaced at 16 in on center.
   2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B.
   3. Size: 0.1875 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inchwire, width of components as required to provide not less than 5/8 inch of mortar coverage from each masonry face.
   4. Vertical adjustment: Not more than 1 1/4 inches.
   5. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      a. Hohmann & Barnard - #270 Ladder Adjustable Eye-Wire according to total cavity wall thickness.

E. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.

F. Partition Anchors: Load Bearing to Load Bearing Wall Connection: Steel, ASTM A 366; ASTM A 36, 3/16 inch or greater, hot dip galvanized after fabrication to ASTM A 153/153M, Class B. Anchor to be 1/4 inch thickness, 1-1/2 inch width.
   1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      a. Hohmann & Barnard - #344 Rigid Partition Anchor.

G. Wall Ties: Non-Load Bearing to Non-Load Bearing and Non-Load Bearing to Load Bearing Wall Connection: Steel, ASTM A 366; ASTM A 36, 3/16 inch or greater, hot dip galvanized after fabrication to ASTM A 153/153M, Class B. Mesh to be 1/2 inch square x 16 gage..
   1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      a. Hohmann & Barnard - #MWT Mesh Wall Tie.

H. Chase Wall Veneer Channel Anchor with Continuous Wire: Install at 4 inch CMU walls over 8 feet in height AFF: Steel, ASTM A 366; ASTM A 36, 3/16 inch or greater, hot dip galvanized after

fabrication to ASTM A 153/153M, Class B. Anchor length - refer to wall type, 1-1/4 inch width, 9 gauge continuous wire, 12 gauge anchors and channels. Install at maximum 6 foot AFF increments and 24 inch on center horizontally, for length of wall.

1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
   a. Hohmann & Barnard - #360 Gripstay Channel and #364-SV Seismic-Notch Gripstay Anchor.

I. Joint Stabilizing Anchors: Dur-O-Wal DA2200 or equivalent.

J. Grout Screen Stop: Dur-O-Wal grout screen stop or equivalent.

K. Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations: Headed Bolts.

2.07 FLASHINGS

A. Rubberized Asphalt Flashing: Self-adhering polymer-modified asphalt sheet; 40 mil minimum total thickness; with cross-linked polyethylene top and bottom surfaces.
   1. For flashing not exposed to the exterior.
   2. Due to the UV sensitivity of flexible flashings all flashings, after installation, must be permanently covered within a reasonable amount of time, not to exceed 30 days.
      a. Product is not to be installed where it would be exposed to sunlight.
   3. Manufacturers: Subject to compliance with requirements manufacturers offering the following products that may be incorporated into the work include:
      a. Grace Construction; Product - Perm-A-Barrier.
      b. Hohmann & Barnard; Product - Textroflash.
      c. Dayton Superior; Product - Dur-O-Wal.
      d. IPCO Illinois Products Corporation; Product - Self-Adhesive Rubberized Asphalt Flashing: www.illinoisproducts.com
      e. Mortar-Net USA: www.mortarnet.com
      f. Advanced Building Products; Product - Strip-n- Flash: www.advancedflashing.com
      g. DuPont: Product - Thru-Wall Flashing: www.Construction.Tyvek.com
      h. BASF: Product - Enershield - TWF: www.enershield.basf.com
      i. Wire Bond: Product - Aqua Flash 500: www.wirebond.com
      j. York Flashings: www.yorkmfg.com
      k. W. R. Meadows: Air-Shield Thru-Wall Flashing: www.wrmeadows.com

B. Flashing Properties:
   1. Rolled, Self-Adhering Sheet Flashing Membrane: 40 mils (1.0 mm) thick membrane.
      a. Color:
         1) Carrier Film: White.
         2) Polymeric Membrane: Black.
      b. Thickness: 40 mils (1mm).
      c. Tensile Strength Film:
         1) ASTM D412, modified (MD): 4,000 psi (27.6 MPa).
         2) ASTM D882 (MD): 23.5 lb./in. (4.1 N/mm).
   2. Elongation Film:
      a. ASTM D412, modified (MD, %): 400 (Typical).
      b. ASTM D882 (MD, %): 400 Min.
   3. Puncture Resistance, ASTM E154: 40 lbf (178 N) Min.
   4. Water Vapor Permeance (free film), ASTM E 96, Procedure B: 0.035 Perms.
   5. Air Permeability, ASTM E283 / E2178: 0.004 cfm/ft.2 @ 75 Pa (1.57 lb / ft.2).
   6. Lap Peel Strength @ 39o F (3.9o C), ASTM D903, 180 Bend: 10 lbf/in. (1.75 N/mm).
   7. Low Temperature Flexibility @ -22o F (-30o C), CGSB 37-GP-56M: Pass

C. Additional flashing system components:
1. Primer, adhesives and seam tape: Provide materials as required by the manufacturer for proper adhesion on the cmu, bituminous dampproofing, fiberglass faced gypsum sheathing, or other substrate.
2. Thru-Wall Flashing Support/Cavity Bridge: "L" shaped, type 304, 27 gauge stainless steel cavity bridge to provide positive support of self-adhered flexible thru-wall flashing across cavity openings. Size to specified cavity wall thickness. Secure to substrate with fasteners through pre-drilled holes.
a. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
1) IPCO Illinois Products Corporation; Product - Type "L" Cavity Bridge: www.illinoisproducts.com

2.08 ACCESSORIES

A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
1. Manufacturers: Subject to compliance with requirements manufacturers offering the following products that may be incorporated into the work include:
a. Dur-O-Wal: www.dur-o-wal.com.
b. Hohmann & Barnard, Inc: www.h-b.com/#sle.
c. MasonPro, Inc: www.masonpro.com
d. WIRE-BOND: www.wirebond.com/#sle.

B. Compressible Filler: Cut to fit or premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane, EPDM, or PVC.
1. Install at tops of non-rated, non -load-bearing and load-bearing, CMU walls running perpendicular or parallel to the metal deck . Place a bead of caulk 1/2 inch back from flute opening and on all sides of flute. Compress plug and slide into place.
a. Perpendicular to metal deck: Williams Products Inc. EVA 200G or 3000 Series Closure Flute Plugs or Strips: www.williamsproducts.net.
1) Closed Cell plugs and strips per ASTM D-1171, ASTM D-925, ASTM D-412. Density: 12.8 lbs/ft

C. Bond Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type 1 (No. 15 asphalt felt.)

D. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, thickness sized to fit the wall cavity air space, height to be minimum 10 inches, and design to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
a. Manufacturers: Subject to compliance with requirements manufacturers offering the following products that may be incorporated into the work include:
1) Advanced Building Products IncMortar Break: www.advancedflashing.com.
2) Hohmann & Barnard, Inc: Mortar Trap : www.h-b.com
3) IPCO Illinois Products Corporation; Product - Mortar Grab: www.illinoisproducts.com
4) Keene Building Envelope Products: KeeneStone Cut: www.keenebuilding.com
5) MasonPro, Inc; ProNet: www.masonpro.com
6) Mortar Net USA, LtdWallDefender: www.mortarnet.com.
7) Archovations,Inc; Cavclear Masonry Mat.
8) Sandell Manufacturing/Hohmann & Barnard Company; Mortar Web: www.h-b.com
9) Mason Pro; ProNet: www.masonpro.com

10) Wire Bond: Cavity Net DT: www.wirebond.com

E. Weeps: Polyethylene tubing.Contractors option to use either cotton rope or polyethylene tubing.

F. Cavity Vents: Molded PVC grilles, insect resistant.
1. Provide polyester mesh or cellular, honeycomb polypropylene cavity vents.
a. Size: 3/8" x 2 1/2" x 3 5/8".
b. Vents to be impervious to water and resistant to UV degradation.
c. Color: Architect to select from manufacturers standard color choices. Minimum six colors.

2.09 MASONRY CLEANERS

A. Cleaning Solution: Consult with brick manufacturer for recommended cleaning procedure and products. Masonry Contractor to match the cleaning method and cleaning solution to the type of brick and type of stain.
1. Prepared solutions: Non-acidic, low odor, water-rinsable solution for use in the final clean up of new masonry.
a. Manufacturer: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
1) Carlisle Coatings and Waterproofing: SimpleKleen Heavy Duty: www.carlisleccw.com
2) Diedrich Technologies: 202 New Masonry Detergent: www.diedrichtechnologies.com
3) EaCoChem; NMD 80: www.eacochem.com
4) Miracle Sealants Company: Liquid Poultice: www.miraclesealants.com
5) Price Research Limited: Price Non-Acidic Masonry Cleaner: www.priceresearchltd.com
6) Prosoco: Safety Klean: www.prosoco.com

2.10 MORTAR AND GROUT MIXING

A. Mortar for Unit Masonry: ASTM C270, using the Property Specification.
1. Extended Life Mortar for Unit Masonry: Mortar complying with ASTM C 1142 may be used instead of mortar specified above at contractor's option.
2. Limit cementitious materials in mortar to portland cement and lime.
3. Loadbearing concrete masonry units below grade and in contact with earth: Type M.
4. Loadbearing concrete masonry units above grade: Type S.
5. Exterior, non-loadbearing masonry veneer units: Type N.
6. Interior, loadbearing concrete masonry units: Type S.
7. Interior, non-loadbearing concrete masonry units: Type N.
8. Interior, non-loadbearing masonry veneer units: Type N.

B. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

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

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches.
   3. Mortar Joints: Concave.

D. Brick Units:
   1. Bond: Running.
   2. Coursing: Three units and three mortar joints to equal 8 inches.
   3. Mortar Joints: Concave.

E. Cut joints flush for masonry walls to be concealed or to receive plaster or other direct applied finishes (other than paint), unless indicated otherwise.

F. Walls to receive ceramic wall tile shall have flush struck joints. Any wall found to be unacceptable by the ceramic tile installer will be corrected to meet specified tolerances.

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.05 WEEPS AND CAVITY VENTS

A. Install weeps in vertical head joints in exterior veneer and cavity walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and above windows, doors, louvers or any other horizontal obstruction of the cavity wall.

B. Install cavity vents in vertical head joints in exterior veneer and cavity walls at 24 inches on center horizontally above and below shelf angles, above lintels, near tops of walls (coordinate top of wall location with coping/fascia or other roof edge covering) and above all openings with through-wall flashing. Also install at the bottom of any seat, screen and/or retaining walls without through-wall flashing.

C. Weeps and cavity vents to be alternated at 24 inches on center.

D. Depending on weep material used:

1. Install cotton wicking through masonry veneer face and turn 8 to 10 inches up, into the cavity, above the height of any mortar droppings. Secure cotton wicking to substrate without penetrating any through wall flashing membrane. Trim cotton wicking material used in weep holes flush with outside face of wall after mortar has set.
2. Install plastic tubes at an angle in the head joint mortar. Remove plastic tubes used in weep holes from wall after mortar has set.

3.06 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

D. Coat cavity face of backup wythe to comply with Division 7 Section "Bituminous Dampproofing".
1. Applies at wall type "C" infill at the existing building only.

3.07 CAVITY WALL INSULATION

A. Sprayed-In-Place Insulation: Comply with Division 7 section "Building Insulation".

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, and CAVITY WALL MASONRY

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Reinforce joint corners and intersections with strap anchors 16 inches on center.

F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

3.09 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
1. Construct formwork to conform to shape, line, and dimensions shown. Make it sufficiently tight to prevent leakage of mortar and grout. Brace, tie and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing reinforcement: Refer to Division 5 sections for requirements.

3.10 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

3.11 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 36 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

F. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 24 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.12 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. Install horizontal joint reinforcement 16 inches on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of openings.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches.

E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches horizontally and 16 inches vertically.

3.13 MASONRY THROUGH-WALL FLASHINGS

A. Install through wall flashing above metal step flashings and reglets, shelf angles and lintels, at bottoms of walls, and above windows, doors, louvers or any other horizontal obstruction of the exterior cavity wall.

B. Whether or not specifically indicated, install masonry through wall flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

C. Where sprayed-in-place thermal insulation will not be installed, secure through wall flashing to substrate with a continuous termination bar. Install continuous sealant at the intersection of the through wall flashing and termination bar.

D. Extend flashing to the face of the masonry veneer.

E. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.14 LINTELS

A. Refer to structural drawings for lintel sizes and additional requirements.

B. Install loose steel lintels over openings.

C. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.

D. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block size units are shown without structural steel or other supporting lintels.

E. Provide minimum bearing of 8 inches at each jamb, unless indicated otherwise.

3.15 GROUTED COMPONENTS

A. Refer to the structural specifications and drawings for additional requirements on grouted masonry.

B. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

C. Place and consolidate grout fill without displacing reinforcing.

D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

E. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
   1. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.16 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

C. Form expansion joint as detailed on drawings.

3.17 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

E. Install reglets and nailers for flashing and other related construction where they are shown to be built in to masonry.

3.18 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.

D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

H. Maximum Variation for exposed head joints thickness: 1/8 inch.

I. Maximum Variation for vertical alignment of exposed head joints: 1/4 inch in 10 feet.

J. Maximum Variation for exposed bed joints thickness: 1/8 inch.

K. Maximum Variation for conspicuous horizontal lines: 1/4 inch in 20 feet.

L. Maximum Variation for conspicuous vertical lines: 1/4 inch in 20 feet

3.19 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.20 FIELD QUALITY CONTROL

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

3.21 REPAIRING AND POINTING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. prepare joints for sealant application.

C. Damaged or chipped concrete masonry units that do not meet the requirements of ASTM C90 for the concrete masonry unit should not be installed. Repair chips, cracks, and other surface damage when visible as viewed in normal lighting conditions at 20 feet. If units incur damage during installation or by other trades, patching of the units shall be with materials compatible with the concrete mix provided in the concrete masonry unit. Provide a finished patch surface texture similar in texture to the concrete masonry unit face being repaired. Do not provide a smooth texture that will result in highlighting the patch when the final paint coats have cured. Patching and repair should be undetectable. Masonry patching by the general contractor, gypsum drywall, painting, or other subcontractor with an incompatible repair product will not be approved.

3.22 IN-PROGRESS CLEANING

A. Remove excess mortar and mortar droppings. Clean masonry work as the work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Replace defective mortar. Match adjacent work.

3.23 FINAL CLEANING

A. Comply with guidelines in Brick Industry Association - Technical Note #20 - Cleaning Brickwork.

B. Remove excess mortar and mortar droppings.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations. Remove large mortar particles by hand with wooden paddles.

F. Test cleaning methods on mock-up wall panel; leave one half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with final cleaning of masonry.

G. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

H. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.

I. Clean brick by bucket and brush hand cleaning method or by pressure sprayer using lowest possible pressure for effective cleaning, as described in BIA Technical Note #20.

J. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2 applicable to type of stain on exposed surfaces. Dry brush walls at the end of each day's work and after final pointing to remove mortar spots and droppings.

3.24 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION 042000

SECTION 042200 - CONCRETE UNIT MASONRY - LOADBEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units (CMU's) in load-bearing walls.
   a. All CMU walls tagged and scheduled on structural drawings are considered “load-bearing walls.”

2. Steel reinforcing bars.

B. Related Sections:

1. Section 042000 "Unit Masonry" for flashing, repairing, pointing, and cleaning requirements.

1.2 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C140 for compressive strength.

2. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For reinforcing steel. Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."

C. Samples: For each type and color of exposed masonry unit and colored mortar.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of product indicated. For masonry units include material test reports substantiating compliance with requirements.

B. Mix Designs: For each type of grout. Include description of type and proportions of ingredients.

1. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

1.5 QUALITY ASSURANCE

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

B. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Section 014000 "Quality Requirements" for mockups.

1.6 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

B. CMUs: ASTM C90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3,750 psi.

2. Density Classification: Medium-weight.

2.3 MASONRY LINTELS

A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from lintel block CMUs with reinforcing bars placed as indicated and filled with coarse grout.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregate for Mortar: ASTM C 144.

1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

2. White-Mortar Aggregates: Natural white sand or crushed white stone.

3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

D. Aggregate for Grout: ASTM C 404.

E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Euclid Chemical Company (The); Accelguard 80.

b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.

c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

F. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A615 or ASTM A996, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A951.

1. Interior Walls: Mill- galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: 0.187-inch diameter.
4. Wire Size for Cross Rods: 0.187-inch diameter.
5. Wire Size for Veneer Ties: 0.187-inch diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82; with ASTM A153, Class B-2 coating.

2. Steel Sheet, Galvanized after Fabrication: ASTM A1008, Commercial Steel, with ASTM A153, Class B coating.

3. Steel Plates, Shapes, and Bars: ASTM A36.

B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.

2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.25-inch diameter, hot-dip galvanized steel wire.

C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 1.05-inch- thick, steel sheet, galvanized after fabrication.

2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.25-inch diameter, hot-dip galvanized steel wire.

3. Corrugated Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.075-inch- thick, steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch of masonry face.

D. Partition Top anchors: 0.105-inch- thick metal plate with 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A153.

F. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene, urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D226, Type I (No. 15 asphalt felt).

2.8 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. For exterior masonry, use portland cement-lime mortar.

3. For reinforced masonry, use portland cement-lime mortar.

4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For masonry below grade or in contact with earth, use Type S.

2. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

3. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for a 28-day compressive strength not less than 3000 psi.

3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143.

PART 3 - EXECUTION

3.1 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.2 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

F. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:

1. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.4 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.

2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.

3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.5 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

2. Limit height of vertical grout pours to not more than 60 inches.

3.6 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

B. Inspections: Level 2 special inspections according to the "International Building Code."

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.

3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

3.7 PARGING

A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch.

B. Use a steel-trowel finish to produce a smooth, flat, dense surface. Form a wash at top of parging and a cove at bottom.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.8 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.

2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.9 MASONRY WASTE DISPOSAL

A. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Do not dispose of masonry waste as fill within 18 inches of finished grade.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042200

SECTION 051200

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes structural steel and grout. The work covered by this Section shall include all labor, material, equipment, permits, engineering and other services necessary for the fabrication and installation of structural steel and related work, complete, in accordance with the drawings and as specified herein.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC 360.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components. The Contractor shall produce and submit Shop and Erection Drawings for the fabrication and erection of the Structural Steel and is responsible for the transfer of information from the Contract Documents into accurate and complete Shop and Erection Drawings and the development of accurate, detailed dimensional information to provide for the fit-up of parts in the field. The Contractor shall neither use nor reproduce any part of the Contract Documents as part of the Shop or Erection Drawings. Submitted shop drawings shall include layouts and details for each member showing the steel type and grade, size, connections, cuts, copes, holes, bolts, welds, surface treatments (cleaning, shop paint, etc.) and provisions for the connection of other work. Steel type, grade and size for all attached elements shall also be shown.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and Fabricator.

B. Welding certificates.

C. Mill test reports for structural steel, including chemical and physical properties.

D. Source quality-control reports.

E. Field quality-control and special inspection reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: The Fabricator shall have 10 years of comparable experience in installations of this type and shall employ labor and supervisory personnel familiar with the type of installation, experienced in fabrication and erection of structural steel for projects of similar size and complexity. At the time of bid the Fabricator shall be AISC certified to the Standard for Steel Building Structures (STD) and must submit proof of these qualifications. The Fabricator's qualifications shall be subject to review by the Design Professionals and Owner.
   1. Fabricators without AISC Certification will be responsible to pay all costs associated for a third party inspector to monitor the work in their shop. Prior approval of the third party inspector is required by the architect and engineer.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE. The Installer shall have 10 years of successful experience erecting structural steel for structures of this type and complexity in the region of the project.

C. The Contractor's Engineer(s) shall be qualified to perform the type of work required by the project. The Engineer(s) shall be a Licensed Structural Engineer(s) in the State of the project. The Contractor's Engineer(s) shall have 10 years of experience being in responsible charge of work of this nature. The proposed Engineer(s) shall be subject to approval of Design Professionals and Owner.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

E. Comply with applicable provisions of the following specifications and documents:

   1. AISC 303.
   2. AISC 360.
   3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

F. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.

E. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

B. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip zinc coating.

C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

D. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

E. Unheaded Anchor Rods: ASTM F 1554, Grade 55, weldable.

1. Configuration: Straight.
2. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

F. Headed Anchor Rods: ASTM F 1554, Grade 55, weldable, straight.

1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

G. Threaded Rods: ASTM A 36/A 36M.

1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

2.3 PRIMER

A. Primer: SSPC-Paint 25, Type II, zinc oxide, alkyd, linseed oil primer.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time. Grout shall also conform to Corps of Engineers specification for non-shrink grout, CRD-C621-83.
1. Twenty-eight day compressive strength as determined by grout cube tests shall be:
    a. 6,000 psi for supporting concrete 3000 psi and less;
    b. 8,000 psi for supporting concrete greater than 3000 psi and less than or equal to 4000 psi;
    c. 10,000 psi for supporting concrete greater than 4000 psi.

B. In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout shall achieve 95% bearing contact under a 48”x48” base plate when placed at a fluid consistency.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

B. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces of high-strength bolted, slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Inspect shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

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

3.2 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

3.3 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.4 TEMPORARY SUPPORT OF STRUCTURAL STEEL FRAME

A. The structure as shown on the Contract Documents is designed to withstand the design loads only when all structural elements are installed and fully connected. The contractor shall be responsible for the analysis of all components and assemblies for stresses and displacements that may be imposed by fabrication, shipping, handling, erection, temporary conditions, construction loads, etc. The analysis of such shall be performed by the Contractor's Engineer.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E 165.
b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

END OF SECTION 051200

SECTION 052100

STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. K-series steel joists.
2. Joist accessories.

B. The work under this section includes design, fabrication and erection of open web steel joists as indicated on the drawings, complete with bridging, attached seats and anchors, joist substitutes compatible with joist seat depths at short spans, labor, accessories and services necessary for the installation of joists and related work.

C. Include supplementary parts and members necessary to complete joist work, regardless of whether such parts and members are indicated on the Drawings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
3. The steel joist shop and erection drawings shall be prepared under and signed and sealed by a Structural Engineer licensed in Commonwealth of Kentucky.
4. The Manufacturer shall neither use nor reproduce any part of the Design Drawings as part of the Shop or Erection Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Manufacturer certificates.

C. Mill Certificates: For each type of bolt.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

2.2 PRIMERS

A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.3 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

C. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.4 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.

B. Apply one coat of shop primer to joists and joist accessories.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

C. Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts.

E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

G. The Contractor shall ensure that no cuts or holes are made in the members of the erected joists for attachment of ceiling, ducts, pipes or any other items not specifically shown in the contract drawings. The use of power driven fasteners in the diagonal and bottom chord members of the joists is prohibited.

H. The Contractor shall not hang any elements from the top or bottom chords of the joists except ceiling, ducts, pipes or other items specifically shown of the contract documents, without the written authorization of the Engineer. All pipes, ducts and other mechanical, electrical and plumbing equipment suspended from the joists shall have the hanger attached at a joist panel point only. All ceilings weighing 3 psf or less may have the grid hung anywhere along the bottom chord. Ceilings weighing more than 3 psf shall have the grid hung only at joist panel points. Heavy pipes, ducts, or other equipment hung from bar joists may require additional joist reinforcement and shall be referred to the engineer for framing.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Visually inspect field welds according to AWS D1.1/D1.1M.

C. Visually inspect bolted connections.

D. Prepare test and inspection reports.

END OF SECTION 052100

SECTION 053100

STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Product Certificates: For each type of steel deck.

C. Evaluation reports.

D. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Steel Deck:

1. Do not rack, bend or mar steel roof deck sheets.
2. Store steel roof deck sheets and accessories above ground and protected from free weathering with one end elevated.
3. Cover and ventilate unpainted or uncoated steel roof deck sheets until final installation.
4. Architecturally exposed steel roof deck sheets shall be appropriately packaged or protected to prevent damage during delivery, storage and handling.

B. Welding Electrodes and Mechanical Fasteners

1. Store welding electrodes, mechanical fasteners and powder-actuated cartridges in original packages in a cool, dry location until final installation.
2. Comply with all project and national safety regulations regarding handling of welding equipment and powder-actuated fastening systems.

C. Sidelap Connectors:

1. Store sidelap connectors in original packages in a cool, dry location until final installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Canam Steel Corporation; Canam Group, Inc.
2. New Millennium Building Systems, LLC.
3. Nucor Corp.

B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
1. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G90 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.Retain roof-deck profile type from "Deck Profile" Subparagraph below. Profiles are based on SDI nomenclature; manufacturers may identify same profiles with other designations. Insert different proprietary profiles, if required, to suit Project.
2. Deck Profile: As indicated.
3. Profile Depth: As indicated.
4. Design Uncoated-Steel Thickness: As indicated.

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Welds and Mechanical Fasteners
1. Powder Actuated Mechanical Fasteners:
   a. Material: AISI 1070 modified
   b. Hardness: Minimum Rockwell Hardness C 54.5
   c. Strength: Minimum tensile strength 285 ksi; minimum shear strength 175 ksi
   d. Design and Manufacture: Knurled shank with forged ballistic point. Manufacturing process shall ensure steel ductility and prevent development of hydrogen embrittlement.
   e. Washers:

1) For steel bar joist framing: Minimum 12 mm (0.472 in.) steel washers
2) For structural steel framing: Minimum 15 mm (0.591 in.) steel washers

f. Corrosion Resistance:
1) For steel roof decks with waterproofing membrane: 5 micron zinc electroplated in accordance with ASTM B 633 SC1 Type III
2) For exposed steel roof decks: Minimum AISI 304 stainless steel sealing caps with bonded neoprene washer shall be installed over each fastener

g. Design Requirements:
1) ICC-ES AC43 or SDI method for diaphragm shear strength and stiffness
2) FM wind uplift resistance
3) UL fire classification

h. Approved Types:
1) For use with steel bar joist and light structural steel framing supports with top chord or flange thickness 1/8 in. to 3/8 in.:
a) Hilti X-HSN24 (1/8 in. up to and including 3/8 in.)
b) Other approved alternative
2) For use with structural steel framing supports with top flange thickness 1/4 in. or thicker:
a) Hilti X-ENP-19 L15 (1/4 in. or thicker)
b) Other approved alternative

2. Screw Fasteners:
a. Material: Carbon Steel; ASTM A 510 Grade 1022
b. Design and Manufacture: Hex washer head self-drilling screw
c. Design Requirements:
1) CC-ES AC43 or SDI method for diaphragm shear strength and stiffness
2) FM wind uplift resistance
d. Approved Types:
1) For use with structural steel framing supports with top flange thickness 0.0598 in. to 1/4 in.:
a) Hilti (Racing Tip 5) S-MD 12-24 x 1-5/8 M HWH5
b) Other approved alternative

3. Welds:
a. Material: Electric shielded arc process using minimum E60XX electrodes in accordance with AWS D1.3 procedures
b. Weld Quality: All welds uniform size and appearance and free of pinholes, porosity, undercutting or other defects
c. Weld Size: Minimum 5/8 in. effective diameter
d. Weld Washers: Use on steel roof deck thinner than 22 gauge

C. Side-Lap Connectors
1. Acceptable types of sidelap connectors:
a. Top or side seam welds
1) 1-1/2 in. long fillet welds in accordance with AWS D1.3 procedures.
b. Mechanical sidelap connectors:
1) Drive mechanical sidelap connectors completely through adjacent lapped roof deck sheets to achieve positive engagement of adjacent sheets with a minimum of three thread penetration.
2) Material: ASTM A 510 Grade 1022
3) Hardness: Minimum Vickers Surface Hardness of 450 HV0.3
4) Design and Manufacture: Hex washer head undercut with reverse serrations; self-piercing or stitch point at center
5) Design Requirements:
a) ICC-ES AC43 or SDI method for diaphragm shear strength and stiffness
b) FM wind uplift resistance
6) Approved Types:
a) Hilti S-SLC01 M HWH Sidelap Connector

b) Hilti S-SLC02 M HWH Sidelap Connector
c) Hilti S-MD 10-16 x 3/4 HWH #3 Stainless Steel Screw
d) Other approved alternative

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.

G. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

C. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

D. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

E. Secure steel roof deck to supporting steel framing with welds or mechanical fasteners. Install welds or mechanical fasteners at the spacing and pattern as shown on the Drawings.

F. Secure steel roof deck sidelap connectors at the spacing and pattern as shown on the Drawings.

G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

I. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches apart with at least one fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten.

J. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. mechanically fasten to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

K. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.

L. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Welds: Examination and qualification of puddle and fillet welds shall be in accordance with AWS D1.3 criteria. Ensure steel roof deck is clamped to the supporting steel framing.

C. Mechanical Fasteners: Examine fastener placement location and washer condition. Ensure steel roof deck is clamped to the supporting steel framing.

D. Testing agency will report inspection results promptly and in writing to Contractor and Architect.

E. Remove and replace work that does not comply with specified requirements.

F. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.3 REPAIRS

A. Welds: Repair all portions of the steel roof deck coating damaged due to weld heat with compatible paint type or zinc rich compound. Repair all burn through marks in accordance with SDI Deck Damage and Penetrations.

B. Mechanical Fasteners: Replace or supplement under-driven and over driven fasteners with adjacent, properly installed fasteners.

C. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

D. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas of prime-painted deck immediately after installation, and apply repair paint.

3.4 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

END OF SECTION 053100

SECTION 055000
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated and/or prefabricated steel, and aluminum items, including:
   1. loose steel lintels and walk-through ladder.
   2. Steel framing and supports for: mechanical and electrical equipment.

B. Manufactured items:
   1. Ships ladder safety post at roof hatch access.

1.02 RELATED REQUIREMENTS

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

B. Section 042000 - UNIT MASONRY: Placement of metal fabrications in masonry.

C. Section 055100 - Metal Stairs.

D. Section 055213 - Pipe and Tube Railings.

E. Section 077200 - Roof Accessories: Guards.

F. Section 099000 - Painting: Final paint finish system for all interior and exterior galanized and/or prime painted items.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.

E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.

I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

K. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

M. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.04 SUBMITTALS

A. 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.

B. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

C. Submit painting and coating product data.

D. Structural Design Data: Where installed metal fabrications are indicated or required to comply with certain design loadings, include structural computations, material properties, and other information needed for review of structural analysis. Computations and analysis shall be stamped by a structural engineer licensed to practice in Kentucky.

1.05 PROJECT CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Recycled Content: Provide steel products having a minimum 30% recycled content.

B. Steel Sections: ASTM A36/A36M.

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

D. Plates: ASTM A283/A283M.

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

F. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

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

I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.
   1. Additional acceptable materials: ZRC Worldwide - ZRC Galvilite: www.zrcworldwide.com

2.02 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.

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. 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.

D. Supply 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 SHOP FABRICATED ITEMS

A. General: Comply with requirements of ANSI A14.3 American National Standard for Ladder-fixed-safety 1992 and OSHA 29 CFR Standard 1910.27.

B. Walk-Through Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; hot dipped galvanized and prime paint finish. Refer to Div 9 Painting specification section for final paint system requirements.
1. Location: Roof
2. Width: Typical clear tread width between side rails to be 2'-6", unless dimensioned otherwise on the drawings.
3. Refer to detail on the drawings for sizes of components and requirements.

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

D. Lintels: As detailed; hot dipped galvanized and prime paint finish. Refer to Div 9 Painting specification section for final paint system requirements.

E. Door Frames for Overhead Door Openings: Channel sections; prime paint finish. Refer to Div 9 Painting specification section for final paint system requirements.

2.05 PREFABRICATED ITEMS

A. Aluminum Ladders: Contractors option in lieu of fabricated steel ladders to provide and install equivalent aluminum ladders.
1. General: Comply with requirements of ANSI A14.3 American National Standard for Ladder-Fixed-Safety 1992 and OSHA 29 CFR Standard 1910.27.
   a. Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
      1) Precision Ladders, LLC.: www.precisionladders.com
      2) ACL Industries, Inc.: www.aclindustries.com
      3) Cotterman Co.: www.cotterman.com
      4) Royalite Manufacturing, Inc. : www.royalite-mfg.com
      5) O'Keeffe's, Inc.: www.okeeffes.com
      6) Kattsafe (formerly FixFast USA): www.kattsafe.com
2. Materials:
   a. Extruded Aluminum Profiles: ASTM B 221/B 221M, ASTM B 210, ASTM B 308/B 308M, Alloy 6061-T6; standard mill finish.
   b. Aluminum Sheet and Plate: ASTM B 209/B 209M, Alloy 6061-T6; standard mill finish.
   c. Fasteners: Aluminum solid aircraft rivets rated at 300 lbs (1335 N) shear strength.
   d. Cast fittings, connectors and rung ends: Cast Aluminum alloy 356.
   e. Finish: All components to have a mill finish.
3. Ladders:
   a. Angled Walk-Through Ladders with Parapet Railings and Platform: Aluminum extrusions; extend railings not less than 42 inches (1,067 mm) above landing, 24 in (610 mm) between side rails at step through. Provide non-penetrating rubber base feet for roof systems.
      1) Basis of Design: Design concept and the drawings indicate the size, profiled, dimensional requirements and aesthetics of the following:

(a) Kattsafe (formerly FixFast USA): KATTCLIMB RL22 Angled fixed ladder with parapet railings and platform.

2.06 FINISHES - STEEL

A. Prepare surfaces to be primed in accordance with SSPC-SP2.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Prime Painting: One coat.

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

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

F. All steel items to be installed on the exterior of the building are to be galvanized.

G. Refer to Div 9 Painting specification section for final paint system requirements for all fabricated steel items.

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. Supply 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.

D. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

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 055000

SECTION 055100
METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stairs with concrete treads.

B. Structural steel stair framing and supports.

C. Pan treads to receive concrete fill, and landings.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Concrete fill in stair pans.

B. Section 055000 - Metal Fabrications.

C. Section 055213 - Pipe and Tube Railings: Metal handrails for the stairs specified in this section.

D. Section 099000 - Painting: Paint finish.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

C. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.

D. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

E. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.04 SUBMITTALS

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

B. Structural Design Data: Where installed metal fabrications are indicated or required to comply with certain design loadings, include structural computations, material properties, and other information needed for review of structural analysis. Computations and analysis shall be stamped by a structural engineer licensed to practice in Kentucky.

C. Welders' Certificates.

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: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
   2. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
   3. Dimensions: As indicated on drawings.
   4. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
   5. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
   6. Separate dissimilar metals using paint or permanent tape.
   7. Recycled Content: Provide steel having a minimum 30% recycled content which is locally recovered.

B. Metal Jointing and Finish Quality Levels:
   1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
      a. Welded Joints: Continuously welded and ground smooth and flush.
      b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
      c. Exposed Edges and Corners: Eased to small uniform radius.
      d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 METAL STAIRS WITH CONCRETE TREADS

A. Jointing and Finish Quality Level: Architectural, as defined above.

B. Risers: Closed.

C. Treads: Metal pan with field-installed concrete fill.
   1. Concrete Depth: 1-1/2 inches, minimum.
   2. Tread Pan Material: Steel sheet.
   3. Tread Pan Thickness: As required by design; 12 gage, .109 inch minimum.
   4. Pan Anchorage to Stringers: Continuously welded, from top or bottom.
   5. Concrete Reinforcement: None.
   6. Concrete Finish: For resilient floor covering.

D. Risers: Same material and thickness as tread pans.
   1. Riser/Nosing Profile: Sloped riser with rounded nosing of minimum radius.
   2. Nosing Depth: Not more than 1 inch overhang.
   3. Nosing Return: Flush with top of concrete fill, not more than 1 inch wide.

E. Stringers: Rolled steel channels.
   1. Stringer Depth: 10 inches.
   2. End Closure: Sheet steel of same thickness as risers welded across ends.

F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

G. Finish: Shop- or factory-prime painted.

2.03 MATERIALS

A. Recycled Content: Provide steel products having a minimum 30% recycled content.

B. Steel Sections: ASTM A 36/A 36M.

C. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.

D. Steel Plates: ASTM A 283.

E. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
   1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
   2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).

F. Ungalvanized Steel Sheet: ASTM A 1008/A 1008M, Designation SS, Grade 33, Type 1.

G. Concrete Fill: Type specified in Section 033000.

2.04 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime Painting: Use specified shop- and touch-up primer.
   1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
   2. Number of Coats: One.

2.05 COMPONENTS

A. Metal Pan Stair Treads: Concrete in metal pan; 1-1/2 inch deep; smooth surface; non-slip edge.

B. Concrete: Type specified in Section 033000.

2.06 FABRICATION - GENERAL

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

B. Fabricate components with joints tightly fitted and secured.

C. 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.

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

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

F. Fabricate components accurately for anchorage to each other and to building structure.

2.07 FABRICATION - PAN STAIRS AND LANDINGS

A. Form treads and risers with minimum 12 gage sheet steel stock.

B. Secure tread pans to stringers with clip angles; welded in place.

C. Form stringers with rolled steel channels, 10 inches deep. Weld fascia plates to channels using 12 gage steel sheet across channel toes.

D. Form landings with minimum 12 gage sheet stock. Reinforce underside with channels to attain design load requirements.

E. Prime paint components.

2.08 FINISHING

A. Prepare surfaces to be primed in accordance with SSPC-SP 2.

B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

C. Do not prime surfaces in direct contact with concrete or where field welding is required.

D. Prime paint items with one coat.

E. Joint Finish: Provide joints with finish #2, completely sanded joints, some underwitting and pinholes per NOMMA Technical Committee guidelines.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

A. When field welding is required, clean and strip primed steel items to bare metal.

3.03 INSTALLATION

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

B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.

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

D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.

E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.

F. Obtain approval prior to site cutting or creating adjustments not scheduled.

G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TOLERANCES

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

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

END OF SECTION 055100

SECTION 055213
PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior wall mounted handrails in steel.

B. Interior stair railings and guardrails in steel.

C. Exterior handrail and guardrail in aluminum.

1.02 RELATED REQUIREMENTS

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

1.03 REFERENCE STANDARDS

A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.

B. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012.

C. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube; 2012.

D. ASTM B429/B429M - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2010.

E. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications; 2013.

F. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.

G. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

1.04 SUBMITTALS

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

B. Submit painting and coating product data.

C. Structural Design Data: Where installed metal fabrications are indicated or required to comply with certain design loadings, include structural computations, material properties, and other information needed for review of structural analysis. Computations and analysis shall be stamped by a structural engineer licensed to practice in Kentucky.

1.05 QUALITY ASSURANCE

A. Steel Handrails and Railings:
   1. Fabricator Qualifications: Company specializing in assembling and installing the steel pipe and tube railing as indicated on the drawings and specified in this section with a minimum five years documented experience.

B. Aluminum Handrails and Railings:
   1. Manufacturer's Qualifications: Company specializing in manufacturing the aluminum non-welded pipe railing specified in this section with a minimum five years documented experience.

2. Installer/Fabricator Qualifications: Company specializing in assembling and installing the manufactured aluminum non-welded pipe railing system specified in this section with a minimum five years documented experience.
   a. Specified aluminum railing is to be provided as a railing system from one of the manufacturers listed, or approved substitution prior to bidding. Fabricated replication of the specified manufactured railing system will not be accepted.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver railing systems and related components in protective packaging.
   1. Upon delivery open cartons and inspect for damage.
   2. Maintain material in original packaging until installation.
   3. Store components to avoid damage from moisture, abrasion, and other construction activities.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum Handrails and Railings: Subject to compliance with requirements manufacturers offering the following products that may be incorporated into the work include:
   1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      a. Superior Aluminum Products, Series 5H (horizontal) Aluminum Non-Welded Pipe Railing.
   2. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect.
      a. C. R. Laurence Co., Inc: www.crlaurence.com.
      b. Hollaender Railing: www.hollaender.com
      c. Kane Sterling: www.kanescreens.com.
      d. Superior Aluminum Products: www.superioraluminum.com
      e. The Wagner Companies; ____: www.wagnercompanies.com/#sle.

2.02 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.

B. Design railing assembly, wall rails, and attachments to resist lateral force of 75 lbs at any point without damage or permanent set. Test in accordance with ASTM E 935.

C. Structural Performance of Handrails and Railings: Provide handrails and railings capable of withstanding the following structural loads without exceeding allowable design working stresses of materials for handrails, railings, anchors, and connections:
   1. Top Rail of Guards: Capable of withstanding the following loads applied as indicated:
      a. Concentrated load of 200 lbf (890 N) applied at any point and in any direction.
      b. Uniform load of 50 lbf/ft. (730 N/m) applied horizontally and concurrently with uniform load of 100 lbf/ft. (1460 N/m) applied vertically downward.
      c. Concentrated and uniform loads above need not be assumed to act concurrently.
   2. Infill Area of Guards: Capable of withstanding a horizontal concentrated load of 200 lbf (890 N) applied to 1 sq. ft. (0.09 sq. m) at any point in system, including panels, intermediate rails, balusters, or other elements composing infill area.
      a. Load above need not be assumed to act concurrently with loads on top rails in determining stress on guard.

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

E. Dimensions: See drawings for configurations and heights.

1. Top Rails and Wall Rails: 1-1/2 inches diameter, nominal round. (1.900 inches Outside Diameter)
2. Intermediate Rails: 1-1/2 inches diameter, nominal round. (1.900 inches Outside Diameter)
3. Posts: 1-1/2 inches diameter, nominal round. (1.900 inches Outside Diameter)

F. 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.

G. Exterior Use Grout: Non-shrink Portland cement-based hydraulic grout mixed and applied in accordance with manufacturer's instructions. Gypsum based material is not acceptable.
1. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating.

2.03 ALUMINUM MATERIALS

A. Primary Horizontal and Support Aluminum Pipe: Schedule 40; ASTM B 429/B 429M, ASTM B 241/B 241M, or ASTM B 483/B 483M.

B. Aluminum Tube for Rails and Posts: Aluminum extrusions; alloy and temper 6063-T4. Minimum wall thickness of 0.127 inch; ASTM B 429/B 429M, ASTM B 241/B 241M, or ASTM B 483/B 483M.

C. Base Flanges, Anchors, and Railing Accessories: ASTM B 247. Manufacturer's standard 713 aluminum alloy cast bases or solid aluminum 6063 stock.

D. Sleeves: ASTM A 120 or ASTM A 53 pipe.

E. Fasteners: Provide concrete anchorage for fastening in aluminum or stainless steel.

F. Exposed Fasteners: No exposed bolts or screws.
1. Provide brackets for handrails that do not require exposed bolts, thru-bolting or fasteners to the guardrail posts.

2.04 STEEL RAILING SYSTEM

A. Recycled content: Provide steel products having a minimum 30% recycled content.

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

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

D. Galvanizing: In accordance with requirements of ASTM A123/A123M.
1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic.
2. All railings for exterior use are to be galvanized.

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

2.05 FABRICATION - STEEL RAIL

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 intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.

2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
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. Joint finish to meet NOMMA finish #2.

E. Expansion Joints in Exterior Rails: Provide slip joint with internal sleeve extending 2 inches beyond joint on each side.
1. Provide for ground/slab mounted or wall mounted railings.
2. Fasten sleeve to one side only.
3. Locate expansion joints to within a minimum of 6 inches to a maximum of 12 inches of a vertical post or handrail bracket.
4. Provide expansion joints at intervals of maximum 20 feet on center.
5. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
a. Wagner Companies: Single Lock Splice-Lock: www.wagnercompanies.com
b. Wagner Companies: Aluminum Internal Sleeve: www.wagnercompanies.com

2.06 FABRICATION - ALUMINUM RAIL

A. Configuration: Size and space members in compliance with applicable codes. All posts shall be unspliced single pipe length. Lower rails shall be a single unspliced length between posts. All top rails shall be continuous.
1. Vertical posts spacing not to exceed 6'-0" center-to-center.
2. Open tube ends or sections are not allowed.
3. Handrail Brackets: Provide bracket with modified pipe adapter tee and thru-bolting hardware. Finish to match railing.
a. Superior Aluminum Products: Part No. 542.
4. Handrail Termination to Post or Loop: Provide thru-bolt with tee. Finish to match railing.
a. Superior Aluminum Products: Part No. 506.

B. All posts grouted in concrete to have one nominal 1/4 inch diameter weep hole, 1/2 inch nominal above post collar in the plane of the rail.

C. Provide all posts with a minimum 15 inch hollow rod for internal reinforcing.

D. Fit, shape and assemble components in largest practical sizes, for delivery to job site. Fabricate components with joints tightly fitted and secured.
1. All pipe cuts shall be square and accurate for minimum joint-gap. Cuts shall be clean and free of chamfer, from deburring, nicks and burrs.
2. Drill holes of proper size for a tight fit of rivets and screws.

E. Expansion Joints: Provide expansion joints for continuous spans in excess of 40 feet. Construct joints by deleting structural adhesive from one end of the spliced joint so that it is free to move in or out of the pipe. If a joint is provided every 30 feet, the width of the gap should allow 1/8 inch expansion for each 40 degrees F of expected temperature rise.

2.07 ALUMINUM FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

A. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

B. Apply one coat of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

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. Anchor railings securely to structure.

D. Sleeve Mounting:
   1. Arrange for casting of sleeves or core drill insitu concrete to provide holes for railing uprights.
   2. After setting, fill holes with hydraulic grout; brace members until grout is cured.

3.04 ATTACHING HANDRAILS TO WALLS

A. Attach handrails to wall with wall brackets. Provide bracket with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface.

B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

C. Secure wall brackets to building construction as follows:
   1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
   2. For hollow masonry anchorage, use toggle bolts.

3.05 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.

END OF SECTION 055213

SECTION 061000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sheathing.

B. Roof-mounted curbs.

C. Roofing nailers.

D. Communications and electrical room mounting boards.

E. Wood nailers and curbs for roofing and items installed on roof.

F. Concealed wood blocking, nailers, and supports.

G. Installation of wood doors and hardware.

1.02 RELATED REQUIREMENTS

A. Section 076200 - Sheet Metal Flashing and Trim: Sill flashings.

B. Section 092116 - Gypsum Board Assemblies: Fiber -glass faced gypsum-based sheathing.

1.03 REFERENCE STANDARDS

A. AF & PA - National Design Specification for Wood Construction. Include supplements.

B. ALSC - American Lumber Standards Committee: Softwood Lumber Standards.

C. APA PRP-108 - Performance Standards and Qualification Policy for Structural-Use Panels (Form E445); 2001.

D. ASTM D2559 - Standard Specification for Adhesives

E. PS 1 - Structural Plywood; 2009.

F. PS 20 - American Softwood Lumber Standard; 2010.

G. SPIB (GR) - Grading Rules; 2014.

1.04 SUBMITTALS

A. Product Data: Provide technical data on application instructions.

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

1.05 QUALITY ASSURANCE

A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.

1.06 DELIVERY, STORAGE, AND HANDLING

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

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

2.02 DIMENSION LUMBER

A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
1. Lumber: S4S, No. 2 or Standard Grade.
2. Boards: Standard or No. 3.

2.03 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.

B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.

D. Grade: "Standard" grade light framing size lumber of any species or board-size lumber as required. "Standard" grade boards per WWPA rules or "No. 2 Boards" per SPIB rules.

2.04 CONCEALED PERFORMANCE-RATED CONSTRUCTION PANELS

A. General: Where construction panels are indicated for the following concealed type sof applications, provide APA Performance-Rated Panels complying with requirements designated under each application for grade designation, span rating, exposure durability classification, edge detail (where applicable) and thickness.

B. Construction Panel Standards: Comply with PS 1 "U.S. Product Standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS 1 provisions, with APA PRP-108

C. Trademark: Furnish construction panels that are factory-marked with APA trademark evidencing compliance with grade requirements.

D. Wall/Roof Parapet Sheathing: APA Rated Sheathing.
1. Contractor to coordinate with roof manufacturer of roof system furnished on whether the use of plywood sheathing or fiber-glass faced gypsum based sheathing meets specified roof system warranty.
   a. Exposure Durability Classification: Exposure 1.
   b. Span Rating: As required to suit stud spacing indicated.
   c. Thickness: Refer to drawings.

2.05 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacturer.
   1. Where rough carpentry is exposed to weather, in ground contact, in contact with preservative treated lumber, or humidity, provide fasteners with hot dip zinc coating per ASTM A 153 or of AISI Type 304 stainless steel.
   2. Nails, Wire, Brads, and Staples: FS FF-N-105.
   3. Power Driven Fasteners: National Evaluation Report NER-272.
   4. Wood Screws: ANSI B18.6.1.
   5. Screws to Cold-Formed Metal Framing: Corrosion-resistant coated, self drilling, self threading steel drill screws with low-profile head.
   6. Lag Bolts: ANSI B18.2.1.
   7. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

2.06 CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.07 ACCESSORIES

A. Fasteners and Anchors:
   1. For treated lumber, use hot-dip galvanized nails, screws, fasteners, and etc. with a minimum coating of G-185 (1.85 oz.) of zinc per square foot of surface area per ASTM A653. Contractor option to use stainless steel nails, screws, fasteners, and etc. in type 304 or 316. Do not use a mix of galvanized and stainless steel products.
      a. Acceptable hot-dip galvanized products are:
         1) Simpson Zmax.
         2) USP Structural Connector Triple Zinc.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.

B. Set rough carpentry to required levels and lines, with members plumb and true to line and cut and fitted.

C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.

E. Countersink nail heads on exposed carpentry work and fill holes.

F. Use common wire nails, unless otherwise indicated. Use finishing nails for finishing work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

3.02 BLOCKING, NAILERS, AND SUPPORTS

A. Install solid wood grounds, nailers, blocking, and sleepers as required for support of wall and ceiling mounted items.

1. Plywood strips and/or metal strapping will not be accepted as sutiable blocking material.

B. Contractor option to use a flexible wood backing plate system in lieu of solid wood blocking as specified in this section.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include:
      a. Clark Dietrich Building Systems - Danback Flexible Wood Backing Plate: www.clarkdietrich.com
      b. Equivalent submitted to Architect prior to issuance of last addendum.

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

D. In walls, provide solid wood blocking attached to studs as backing and support for wall-mounted items,

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

F. Provide the following non-structural framing and solid wood blocking, but not limited to the following locations:
   1. Cabinets, shelf, and countertop supports.
   2. Wall mounted cabinets.
   3. Wall brackets.
   4. Handrails and guardrails.
   5. Fire extinguisher cabinets, brackets, and valve cabinets.
   6. Grab bars.
   7. Toilet and bath accessories.
   8. Toilet and urinal partitions.
   9. Wall-mounted door hardware and stops.
   10. Chalkboards, tackboards, and marker boards.
   11. Wall paneling and trim.
   12. Joints of rigid wall coverings that occur between studs.
   13. Locker base and wall attachment.
   14. Interior and exterior wall openings to receive metal frame system; window, door, etc.
   15. Access panels.
   16. Framed openings.
   17. Plumbing fixtures.
   18. Ceiling mounted projection screens and projector mounts.
   19. Wall mounted projection screens and projector mounts.
   20. Wall and ceiling mounted items indicated as N.I.C. and/or Owner provided and Owner installed.

3.03 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

A. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

B. Coordinate curb installation with installation of decking and support of deck openings.

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.

3.05 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.

3.06 CLEANING

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

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

END OF SECTION 061000

SECTION 064100
INTERIOR ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SECTION INCLUDES

A. This Section includes the following:
1. Interior standing and running trim and custom self-edged casework.
2. Reception casework (HPL1 & HPL2)
3. Display Case Components (DC1-DC6)
4. Corridor bench. (SWV1)
5. Solid Surface Windowsills. (SS3)
6. Stainless steel countertops & Wall Cladding. (STL1 & STL2)
7. Custom Display Cases with light by MEP contractor
8. Solid Surface Countertops. (SS1) (SS2)
9. Fabric covered tackable surfaces (DCF1)
10. Plastic Laminate Countertops (HPL4)

1.03 RELATED REQUIREMENTS

A. Section 013000 - Administrative Requirements - Submittal procedures.

B. Section 054000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.

C. Section 061000 - Rough Carpentry: Building framing and sheathing.

D. Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.

E. Section 123550 - Institutional Casework: (plastic laminate faced wood cabinets of stock design).

1.04 DEFINITIONS

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

B. Exposed Portions of Cabinets: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches (1220 mm) above floor, and surfaces visible in open cabinets. The bottom of wall cabinets are considered exposed and will receive **plastic laminate**.

C. Semiexposed Portions of Cabinets: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches (1980 mm) or more above floor are defined as semiexposed.

D. Concealed Portions of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, and ends and backs that are placed directly against walls or other cabinets.

1.05 REFERENCE STANDARDS

A. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.06 SUBMITTALS

A. Samples for Verification: 6-inch- (150-mm-) square Samples for each type of finish, including top material and the following:
1. Section of countertop showing top, front edge, and backsplash construction.

B. Product Data: For each type of product indicated including cabinet hardware and accessories and finishing materials and processes.

C. Product Data: For each type of product indicated.

D. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

E. Shop Drawings: Show fabrication and installation details for institutional casework. Include plans, elevations, sections, details, and attachments to other Work.

F. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
1. Plastic laminates.
2. Thermoset decorative overlays.

G. Samples for Initial Selection: For cabinet finishes and for each type of top material indicated.

H. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.

I. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Source Limitations: Obtain institutional casework through one source from a single manufacturer.

D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards," Section 1600.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.09 PROJECT CONDITIONS

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

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field

measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 COORDINATION

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

B. Hardware Coordination: Distribute copies of approved hardware legend specified in Division 8 Section "Door Hardware (Keyed by Naming Products) " to fabricator of architectural woodwork; coordinate Shop drawings and fabrication with hardware requirements.

1.11 SEQUENCING AND SCHEDULING

A. Coordinate the work with all sections referencing this section.

1.12 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of casework that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
1. Delamination of components or other failures of glue bond
2. Warping of components.
3. Failure of operating hardware.
4. Deterioration of finishes.

B. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 WOODWORK FABRICATORS

A. All manufacturing technic and components must comply with the contract specifications. The designer's selections will not be limited to those plastic laminate selections which are the standards of the casework manufacturer. The plastic laminate selections will be made from the laminate manufacturer(s) full range of colors, patterns and finishes.

B. Multiple manufacturers of work of this section will not be accepted. Subject to compliance with requirements, interior architectural woodwork by one of the following include :
1. Leininger Cabinets.
2. Louisville Lumber.
3. Riverside Mill.
4. Morgan Smith Industries.
5. Caseworks of Kentucky, Inc.
6. Custom Creations, Inc.
7. LSI Corporation, Inc.
8. Cabinets & Countertops, Inc.
9. Reynolds & Poyle, Inc.
10. Cumberland Manufacturing
11. Kentucky Mill & Casework
12. Wood Concepts
13. Accents in Wood, Inc.
14. Cowart & Company.
15. Southern Cabinetry, Inc.
16. Stevens Industries, Inc.
17. Action Outfitters.
18. Smith's Laminating.
19. Corman & Associate's, Inc.

20. Euronique, Inc.
21. America's Finest Woodworking Team.
22. US Millwork.
23. Kentucky Caseworks.
24. SSC Casework & Millwork.
25. Stidham Cabinets.
26. Diversified Woodworking.
27. Tate Ornamental.
28. Interior Wood Specialties.
29. Custom cabinetry companies whose products meet or exceed the project specifications as approved by written addendum.

C. Refer to the drawings for premium laminate and/or decorative metal laminate locations.

2.02 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Species and Cut for Transparent Finish: (insert wood species), plain sawn or sliced.

C. Wood Species for Opaque Finish: Any closed-grain hardwood.

D. Wood Products: Comply with the following:
1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2, Grade MD-Exterior Glue.
3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
5. Hardwood Plywood and Face Veneers: HPVA HP-1.
6. Exposed Plywood: Hardwood plywood, selected for compatible color and grain. Grade AA exposed faces at least 1/50 inch (0.5 mm) thick, and Grade J crossbands. Provide both faces of same species.
7. Semiexposed Plywood: Hardwood plywood of same species as exposed plywood. Semiexposed backs of plywood with exposed faces shall be same species as faces. Grade B faces and Grade J crossbands.

E. Thermoset Decorative Overlay: Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
   a. Formica Corporation.
   b. Nevamar.
   c. Wilsonart.
   d. Arborite.

G. Exposed Cabinet Materials:
1. Plastic Laminate: Type VGS.
   a. Unless otherwise indicated, provide plastic laminate for exposed surfaces.
   b. Provide plastic laminate for doors and drawer fronts and where indicated.

H. Semiexposed Cabinet Materials:
1. Plastic Laminate: Type CLS.
   a. Provide plastic laminate for interior faces of doors and drawer fronts [only/and] where indicated.

2. Melamine-Faced Particleboard: Particleboard with decorative surface of thermally fused, melamine-impregnated web and complying with LMA SAT-1.
   a. Provide melamine-faced particleboard for semiexposed surfaces, unless otherwise indicated.
3. Cabinets with glass doors: Provide plastic laminate within the cabinet to match the exterior of the cabinet unless shown otherwise on the drawings.

I. Concealed Cabinet Materials:
1. Solid Wood: Any hardwood or softwood species, with no defects affecting strength or utility.
2. Plywood: Hardwood plywood. Concealed backs of plywood with exposed or semiexposed faces shall be same species as faces.
3. Plastic Laminate: Type BKL.

J. High Pressure Laminate- (HPL1)
1. Manufacturer: Wilsonart
2. Color: Sap Walnut
3. Number: 8221-38
4. Finish: Equal to Fine Velvet
5. Location: Reception Desk

K. High Pressure Laminate- (HPL2)
1. Manufacturer: Wilsonart
2. Color: Lapis Blue
3. Number: D417-60
4. Finish: Equal to Matte
5. Location: Reception Desk

L. High Pressure Laminate- (HPL3)
1. Manufacturer: Wilsonart
2. Color: Phantom Cocoa
3. Number: 8213K-28
4. Finish: Equal to Fine Velvet
5. Location: Pharmacy Casework

M. High Pressure Laminate- (HPL4)
1. Manufacturer: Wilsonart
2. Color: Pewter Mesh
3. Number: 4878-38
4. Finish: Equal to Fine Velvet
5. Location: Pharmacy Countertop

N. High Pressure Laminate- (HPL5)
1. Manufacturer: Wilsonart
2. Color: Carbon Mesh
3. Number: 4480-38
4. Finish: Equal to Fine Velvet
5. Location: RR Vanities

O. Display Case Components (DC1-6)
1. **Companies offering a display case complete "box" installation will be considered in bidding phase. Box must be able to fit without construction parameters and openings already shown on drawings. Display case companies whose products meet or exceed the project specifications shall be approved by written addendum.**
2. DC1 - Steel Track Assembly
   a. Manufacturer: Knape & Vogt
   b. Style: Steel Track Assembly
   c. Model: P992 ZC
   d. Side Track: 993

e. Lock Number: 963 ZC
f. Finish: Zinc
g. Notes: Provide Side Tracks 993 and Lock No. 963 ZC

3. DC2- Tempered Glass Doors - on track
   a. Manufacturer: TBD
   b. Style: Glass Doors
   c. Notes: 1/4" thick, tempered glass door; Two doors shall be on a track.
4. DC3 - Tempered Glass Shelves
   a. Manufacturer: TBD
   b. Style: Glass Shelves
   c. Size: 16"d x 26"w x 1/4"thick (Field verify sizes)
   d. Tempered with polished edge, 9 shelves per display case
5. DC4 - Display Case Cabling Starter Unit
   a. Manufacturer: Udizine
   b. Style: Floor to Ceiling Cable Kit for 3 Glass Shelves
   c. Model: UDI-ASC02-BG3
   d. Color: Glass shelves, stainless steel cable with Satin Chrome coating
   e. Size: 3 shelves high
   f. Cable: Stainless Steel 1/16" with Satin Chrome coating
   g. Notes: Shelf height spaced evenly
   h. Qty: Provide one per display case
6. DC5 - Display Case Cabling Extension Unit
   a. Manufacturer: Udizine
   b. Style: Floor to Ceiling Cable Kit for 3 Glass Shelves
   c. Model: UDI-ASC02-EG3
   d. Color: Glass shelves, stainless steel cable with Satin Chrome coating
   e. Size: 3 shelves high
   f. Cable: Stainless Steel 1/16" with Satin Chrome coating
   g. Notes: Shelf height spaced evenly
   h. Qty: Provide two extension units per display case
7. DC6 - Temper Glass - Fixed Panel
   a. Manufacturer: TBD
   b. Style: Glass Panel - Fixed in place
   c. Notes: 1/4" thick, tempered glass door; Two doors shall be on a track and this final panel shall be fixed. Track P992ZC only offers a 2-door system, however three-door track systems offered will be acceptable.

P. Low Profile Pencil Drawer (Standard Depth)
1. Manufacturer: Mount-It
2. Style: MI-7148
3. Color: Black
4. Size: 21.25"W x 16.25"D
5. Location:

Q. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with material and performance requirements in ANSI Z124.3, for Type 5 or Type 6, without a precoated finish.
1. Products: Subject to compliance with requirements, provide one of the following:
   a. Wilsonart
   b. Corian; DuPont Polymers.
   c. Gibraltar.
   d. LG Surfaces.
2. Price Group: Based on selections from Corian provide price group up to Price group D
   Note: Require caulk at intersection of SS sill and gypsum board walls.

R. Fabric-Covered Tackable Surfaces: Dimensionally stable 6-7 PCF glass fiberboard with resin hardened edge (if required) 3/4" thick with a fabric covering equivalent to Guilford of Maine FR701.

2.03 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware (Scheduled by Describing Products)." Refer to the drawings for additional hardware components.

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

C. Hinges: Provide five knuckle, 2-3/4 inch, overlay type, hospital tip, 0.95 inch thick steel. Hinges shall have a minimum of eight (8) edge and leaf fastening. Doors 48 inches and over in height shall have three (3) hinges per door.

D. Pulls: Pulls as standard shall be surface mounted solid aluminum, 4" wide.

E. Catches: Roller catches, BHMA A156.9, BO3071.

F. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081 or BHMA A156.9, B04102; with shelf brackets, B04112. Shelf standards and supports shall be equal to Knape and Vogt 182 decorative heavy duty bracket and standards.

G. Shelf Rests: BHMA A156.9, B04013.

H. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads:
   1. Box Drawer Slides: 100 lbf (440 N).
   2. File Drawer Slides: 150 lbf (670 N).
   3. Pencil Drawer Slides: 45 lbf (200 N).
   4. Keyboard Slide: 75 lbf (330 N).

I. File Drawer Frame System: Provide a metal file frame system in all file drawers equal to Rockler Woodworking & Hardware # 30976 with cut-to-size side rails, front & back rails, and side-to-side rail.

J. Locks: Locks for drawers, hinged doors, and glass doors at display cases where specified, shall be heavy-duty, cylinder type with five disc tumblers and shall be keyed and master-keyed as specified. Locate as indicated on the drawings.

K. Grommets for Cable Passage through Countertops: 3-1/2-inch (51-mm) OD, molded-plastic grommets and matching plastic caps with slot for wire passage. Color to be selected by Designer.
   1. Product: Subject to compliance with requirements, provide "YG1 and YG2 series" by Doug Mockett and Co., Inc.

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

M. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.

N. Countertop Support: Provide countertop supports equivalent to A & M Hardware, Inc. Workstation brackets, size brackets to suit installation. **(HEAVY DUTY) @ workstations**

O. Counter/Shelf Supprt: Provide counter/shelf supports equivalent to Rakks Inc.
   1. EH-1209 - 12" h x 9" d.
   2. EH-1212 - 12" h x 12" d.
   3. EH-1818 - 18" h x 18" d.
   4. EH-1824 - 18" h x 24" d.

P. Shelf Bracket: Provide shelf brackets equivalent to Doug Mockett & Co., Phone: 1-800-523-1269. 18 5/16" perforated work support number SWS1. Provide sufficient quantity to hold countertop level and secure.

2.04 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.05 FABRICATION, GENERAL

A. Interior Woodwork Grade: Provide Custom grade interior woodwork complying with the referenced quality standard.

B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

C. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
   1. Seal edges of openings in countertops with a coat of varnish.

E. All wall and base cabinets over 3'-0" in width shall receive a vertical to prevent deflection.

2.06 PLASTIC-LAMINATE CABINETS

A. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets.

B. Grade: Custom.

C. AWI Type of Cabinet Construction: Flush overlay.

D. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
   1. Horizontal Surfaces Other Than Tops: HGS.
   2. Postformed Surfaces: HGP.
   3. Vertical Surfaces: HGS.
   4. Edges: **Self-edged plastic laminate.**
   5. Body Front Edging: HGS

E. Materials for Semiexposed Surfaces: Provide surface materials indicated below:

F. Box Drawers: ½" solid hardwood sides, dovetailed and glued. 1/4" five ply hardwood bottom, fitted into dado, glued and blocked into place. Equip with full extension drawer glides, including tops to prevent accidental removal.

G. File Drawers: ½” solid hardwood sides, dovetailed and glued. ½" five ply hardwood bottom, fitted into dado, glued and blocked into place. Equip with full extension file drawer slides, 150 lb load capability, including stops to prevent accidental removal.

H. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Solid colors.
   2. Wood grains.

3. Patterns.

I. Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

J. Wood grains and/or any laminate with a directional design shall all be applied to the cabinet face in one consistent direction.

2.07 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Comply with AWI Section 400 requirements for high-pressure decorative laminate countertops.

B. Grade: Custom.

C. High-Pressure Decorative Laminate Grade: HGS.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
1. Solid colors.
2. Wood grains.
3. Patterns.

E. Plastic Laminate Countertops: Plastic laminate countertops shall be minimum 1-1/2" thick with horizontal grade plastic laminate on all exposed sides, including edges, back and endsplashes, underside shall have laminate backer sheet, all countertops shall be continuous.
1. Provide 4" back and side splashes at all junctures of countertop and any vertical surface.
2. Edges: **Self-edged plastic laminate.**

F. Core Material: Particleboard made with exterior glue.

G. Core Material at Sinks: Exterior-grade plywood.

2.08 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Quality Standard: Comply with AWI Section 400 requirements for countertops.

B. Grade: Custom.

C. Solid-Surfacing-Material Thickness: 1/2 inch (13 mm), unless shown otherwise on drawings.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:
1. Edge: **Eased**

E. Fabricate tops in one piece with field-applied backsplashes and edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

2.09 STAINLESS STEEL COUNTERTOPS & WALL CLADDING (STL1 & STL2)

A. Stainless Steel Countertops (STL1): 304 stainless steel countertops 14 gauge with turned down aprons. Finish all exposed edges to be smooth and free of burs. Use exterior plywood or pheholic-resin-bonded particle board for substraight.

B. Stainless Steel Wall wrap (STL2): 304 stainless steel countertops 14 gauge with turned down aprons. Finish all exposed edges to be smooth and free of burs. Use exterior plywood or pheholic-resin-bonded particle board for substraight.

PART 3 EXECUTION

3.01 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

3.02 INSTALLATION

A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

C. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.

D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including those for adhesives used to install woodwork.

E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c.

G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
   1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
   2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   3. Caulk space between backsplash and wall with clear silicone.

H. Refer to Division 9 Sections for final finishing of installed architectural woodwork.

I. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) tp greatest extent passible. Do not use pieces less than 60 inches long, except when shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.
   1. Fill gaps, if any, between top of base and wall with plastic wood filler, and sand smooth, and finish same as wood base if finished.
   2. Install standing and running trim with no more variation from a straight line than 1/8 inch in 96 inches.

J. Paneling: Anchor paneling to supporting substrate with concealed panel-hanger clips. Do not use face fastening, unless covered by trim or otherwise indicated.
   1. Install flush paneling with no more than 1/16 inch in 96-inch vertical cup or bow and 1/8 inch in 96-inch horizontal varification from a true plane.

K. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.03 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 070810
EXTERIOR BUILDING ENCLOSURE WEATHER BARRIER REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section includes administrative and procedural requirements for accomplishing a weather-tight building enclosure that controls infiltration or exfiltration of air, including but may not be limited to:
   1. The airtight components of the building enclosure and the joints, junctures and transitions between materials, products, and assemblies forming the air-tightness of the exterior building enclosure shall be “the air barrier system.”
   2. Coordinate between trades, schedule and sequence the Work, and provide preconstruction meetings, inspections, tests, and related actions.
   3. Reports performed by Contractor, independent agencies, and governing authorities.
   4. Construct the building enclosure with a continuous air barrier system to control air leakage into (infiltration) and out of (exfiltration) conditioned spaces. The air barrier system shall have the following characteristics:
      a. Continuous, with all joints sealed.
      b. Structurally supported to withstand positive and negative air pressures applied to the building enclosure.
      c. Connections between:
         1) Foundation and walls.
         2) Walls and windows and doors.
         3) Different wall systems.
         4) Wall and roof.
         5) Walls, floors, and roofs across construction joints, control joints and expansion joints.
         6) Walls, floors and roofs to utility, pipe and duct penetrations.
   5. Make all penetrations of the air barrier membrane or system and paths of air infiltration / exfiltration air-tight.

1.02 RELATED REQUIREMENTS

A. Section 070810.13 - Weather Barrier System Pre-Installation Conference Guide: Pre-Installtion requirements.

1.03 RESPONSIBILITIES

A. Contractor responsibilities:
   1. Coordinate affected trades and sequence construction to ensure continuity of the air barrier system, joints, junctures, and transitions between materials and assemblies of materials and products, from substructure to walls to roof.
      a. Coordinate the sequence of activities to accommodate required services with a minimum of delay.
      b. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
   2. Provide quality assurance procedures, testing and verification as required.
      a. Schedule times for inspections, tests, taking samples, and similar activities.
   3. Facilitate inspections, tests, and other quality-control services required.
      a. Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested.
      b. Notify the agency sufficiently in advance of operations to permit assignment of personnel.
      c. Services include, but are not limited to, the following:
         1) Provide access to the Work.
         2) Furnish incidental labor and facilities necessary to facilitate inspections and tests.

3) Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
4) Deliver samples to testing laboratories.
5) Provide security and protection of samples and test equipment at the Project Site.

4. Organize preconstruction meetings between the trades involved in the whole building's air barrier system to discuss where each trade begins and ends and the responsibility and sequence of installation of all the air-tight joints, junctures, and transitions between materials, products and assemblies of products specified in the different sections, to be installed by the different trades.
5. Provide mockup of exterior wall assembly as required.
6. Coordinate the Work and trades to provide an airtight building enclosure.
   a. Continuity of the air barrier materials and products with joints to provide assemblies.
   b. Continuity of all exterior enclosure assemblies with joints and transition materials to provide an exterior enclosure air barrier system.
   c. Specific quality-control requirements for individual construction activities are also indicated in other applicable sections of the specifications. Ensure each subcontractor is adequately and satisfactorily performing the quality assurance documentation, tests and procedures required by each such section.
   d. Inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
   e. Requirements to provide an airtight exterior building enclosure is not limited by quality-control services performed by Architect, Owner, or authorities having jurisdiction and are not limited by provisions of this section.

1.04 PERFORMANCE REQUIREMENTS

A. Materials: Used for the air barrier system in the opaque envelope shall have an air permeance not to exceed 0.004 cfm/ft2 under a pressure differential of 0.3 in. water (1.57psf) (0.02 L/s.m2 @ 75 Pa) when tested in accordance with ASTM E 2178.

B. Assemblies of materials and components: Shall have an air permeance not to exceed 0.04 cfm/ft2p under a pressure differential of 0.3 in. water (1.57psf) (0.15 L/s.m2 @ 75 Pa) when tested in accordance with ASTM E 2357.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings" and adhere to the following specifics regarding masonry pre-installation conference guidelines.
   1. The General Contractor/Construction Manager should organize and hold a meeting with the Owner, Architect, General Contractor/Construction Manager, site superintendent, masonry foreman, testing and inspection agency representative, installers of cavity wall insulation, storefront, curtain wall, door and window, installers of steel, joist and deck, installers of mechanical, electrical and plumbing items, installers of other work in and around the masonry that must precede or follow masonry work.
   2. Review foreseeable methods and procedures related to masonry work, including but not necessarily limited to the following:
      a. a)Sample and Mock-up Wall Sections:
         1) Size and Location
         2) Products and Detail required
         3) Protection Methods of Sample and Mock-up Wall Sections
         4) Approval Authority and Notification

b. Site Inspection:
   1) Identity of Responsible Person
   2) Frequency of Inspection
c. Materials:
   1) Storage & Protection
   2) Delivery Process
d. Submittals:
   1) Product Certification
   2) Shop Drawing Requirements
   3) Time Expectation
   4) Testing and Inspection Requirements
e. Construction Means and Methods:
   1) Hot & Cold Weather Protection
   2) Protection of Work in Process
   3) Material Handling Process
   4) Cleaning Process
f. Schedule:
   1) Product Availability
   2) Review of Associated Trades Responsibility
g. Project Closeout:
   1) Punch List Procedure

3. Record (Contractor) discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 REPAIR AND PROTECTION

A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.

B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protect the Work, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 070810

SECTION 070810.13
WEATHER BARRIER SYSTEM PRE-INSTALLATION CONFERENCE GUIDE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Few building construction components require the coordinated activities of more different trades on the construction, design, and management teams than the water, air, vapor and thermal barrier system. Once the water, air, vapor and thermal barrier has been covered, any remedies for problems with the components or installation can be costly and time-consuming.

1.02 PREINSTALLATION

A. Contractor and subcontractors must have a working knowledge of the water, air, vapor and thermal barrier installation, proper sequencing, and must work toward a common goal. Through the use of the integrated mockup panel and this Pre-Installation Conference Guide, gaining such knowledge should be enhanced.

B. Send a copy of this guide to the affected trades and/or attendees so they can attend the Conference prepared to discuss these topics and to fill in as much of this information as possible prior to the meeting, or be prepared to fill them in at the meeting.

1.03 TASK CHECKLIST

A. Submit and/or complete the following prior to conducting the Pre-Installation Conference. Confirm any additional submittal requirements with the relevant specification sections. Check those items below that you have completed or received "Approved" submittals from the Architect.

Submittals	**Approved**
Product data	
Shop drawings	
Product Certificates	
Product test reports	
Installer qualifications	
Samples	
Compatibility docs	
Integrated mockup	
Quality Assurance Program	
ABAA certifications	
Warranty Sample	
Air Barrier System Subcontractor reviewed submittals of other indicated/specified trade(s)	

1.04 MANDATORY ATTENDEES

A. Attendance by the following parties and affected trades is mandatory. Identify and ensure any other trades or parties involved or affected by the installation of the air barrier system components are also present. Check those below who actually attend the meeting.

Owner and/or Owner's representative
Architect
Owner's Testing Agency (if hired to inspect ABS)

Contractor
Air barrier installer / subcontractor

Air barrier manufacturer's technical representative

Masonry subcontractor
Roofing subcontractor
Window opening subcontractor
Sheathing subcontractor
Exterior Insulation subcontractor
Concrete subcontractor
Exterior Metal Panel subcontractor
Cold Formed Metal Framing - Structural (CFMF-S) subcontractor
Steel frame (hollow metal) subcontractor

Waterproofing subcontractor
Underslab Vapor Barrier subcontractor

1.05 REVIEW OF RELEVANT PROJECT CONTRACT SPECIFICATION SECTIONS

A. Review the Contract Specifications and identify and note any modifications that may be necessary, so all parties understand what is required of them. Submit any modifications via appropriate supplemental documents (FC or PCO).

Spec Section	**Modifications (if any)**
019113 - Commissioning Requirements	
019119 - Building Envelope Testing	
042000 - Unit Masonry	
070810 - Exterior Building Enclosure Weather Barrier Requirements	
071300 - Underslab Sheet Waterproofing	
071326 - Waterproofing	
072100 - Thermal Insulation	
074113 - Metal Roof Panels	
081113 - Hollow Metal Doors and Frames	
084313 - Aluminum Framed Storefronts	
084413 - Glazed Aluminum Curtain Walls	
088000 - Glazing	

1.06 REVIEW OF RELEVANT PROJECT CONTRACT DRAWINGS

A. Review the Contract Drawings and identify and note any modifications that may be necessary, so all parties understand what is required of them. Submit any modifications via appropriate supplemental documents (FC or PCO).

Project Contract Drawing or Detail Number	**Modifications (if any)**

1.07 REVIEW OF RELEVANT PROJECT SHOP/SUBMITTAL DRAWINGS

A. Review the submittals and identify and note any modifications that may be necessary, so all parties understand what is required of them. Resubmit those submittals that have not been approved by the Architect.

Project Submittal / Shop Drawing Reference	**Modifications (if any)**

1.08 REVIEW OF PRODUCTS

A. Review the type of air barrier system that will be provided on the Project and identify each component.

Component	**Actual Product to be provided for Project**
SPF insulation - field of wall	
SPF insulation (wall) - voids / cracks / shims	
SPF insulation - field of roof	
Fluid-applied membrane - Permeable - wall	
Fluid-applied membrane - Impermeable -wall	
Self-adhered membrane - Permeable - wall	
Self-adhered membrane - Impermeable -wall	
Self-adhered membrane - Permeable - roof	
Self-adhered membrane - Impermeable -roof	
Transition membrane - self-adhered	
Primer	
Mastic / Termination sealant	

1.09 CONSTRUCTION TIE-IN RESPONSIBILITY

A. Air barrier systems are successful when a full building envelope/enclosure - without penetrations, voids, holes, gaps, and cracks - is complete. This is critical when numerous trades are involved in the tying-in of the air barrier system to all facets of the exterior building envelope. Utilize the table below to ensure everyone knows who is responsible for the indicated tie-in.

Tie-in Area	**Subcontractor responsible for tie-in**
Exterior footing to exterior foundation wall	
Exterior foundation to exterior wall	
Slab-on-grade to wall (exterior and interior)	
Slab-on-grade joints	
Slab-on-grade penetrations	
Exterior wall to steel frame/hollow metal (e.g., doors and windows)	

Exterior walls to aluminum frames (e.g., windows and louvers)
Different exterior wall systems (e.g., masonry to metal)
Exterior head-of-wall to sloping roof
Parapet walls to roof
Exterior wall joints
Exterior shelf angles
Exterior steel lintels
Exterior wall penetrations (e.g., pipes, ducts)
Roof penetrations
Roof perimeter

1.10 COMPATIBILITY REVIEW

A. Each trade/installer shall identify materials that may have potential compatibility issues. For example, some membranes may be subject to decomposing when placed in contact with other materials or components, especially sealants and primers; or may deteriorate if left exposed to the elements and are not protected.

Trade / Installer	**Issues / Resolutions**
Air barrier	
Window	
Steel frame (hollow metal)	
CFMF-S	
Exterior Metal Panels	
Waterproofing	
Masonry	
Roofing	
Sheathing	
Concrete	
Insulation	
Flexible Flashing	
Metal Flashing	
Structural steel	
Substrate primer considerations:	

1.11 SUBSTRATE PRIMER CONSIDERATIONS:

A. Indicate whether the substrate for the air barrier material requires the use of a primer, and if so, identify the actual product to be used on the Project.

Substrate	**Yes**	**No**	**Product**
CMU			
Sheathing			
Concrete			
Precast			
Metal Panels			
Roof substrate board			
Flexible Flashing			

Metal Flashing
Waterproofing
Steel frame / hollow metal
Structural steel
Substrate preparation considerations:

1.12 SUBSTRATE PREPARATION CONSIDERATIONS:

A. Indicate whether the substrate for the air barrier material requires special treatment or preparation (e.g., flush joints in CMU), and if so, identify the method to be used on the Project. Delete those that do not apply.

Substrate	Yes	No	Method / Procedure	Subcontractor responsible
CMU				
Sheathing				
Concrete				
Precast				
Metal Panels				
Roof substrate board				
Window frames				
Flexible Flashing				
Metal Flashing				
Waterproofing				
Steel frame / hollow metal				
Structural steel				
Joint considerations:				

1.13 JOINT CONSIDERATIONS:

A. It is critical for all joints, gaps, voids, cracks, seams, etc. to be sealed/closed for the air barrier to function properly (based on air barrier manufacturer's instructions). If applicable, indicate the method to be used to close the joints and who is responsible. Delete those that do not apply.

Type of joint	Method used to close joint	Subcontractor responsible
CMU		
Sheathing		
Concrete		
Precast		
Metal Panels		
Roof substrate board		
Window frames		
Steel (hollow metal) frames		
Head-of-wall		

1.14 INSTALLATION TEMPERATURES:

A. A major factor in contributing to a successful air barrier system installation is to monitor and install the components within the proper temperature ranges and weather conditions. Indicate below the proper temperature range for each component; the procedure for maintaining the proper temperature range; and the party responsible for maintaining the proper temperature range in accordance with the requirements.

Component	Proper temperature range	Procedure and Subcontractor responsible
SPF insulation - field of wall		
SPF insulation (wall) - voids / cracks / shims		
SPF insulation - field of roof		
Fluid-applied membrane - Permeable - wall		
Fluid-applied membrane - Impermeable -wall		
Self-adhered membrane - Permeable - wall		
Self-adhered membrane - Impermeable -wall		
Self-adhered membrane - Permeable - roof		
Self-adhered membrane - Impermeable -roof		
Transition membrane - self-adhered		
Primer		
Mastic / Termination sealant		

1.15 AIR BARRIER PROTECTION:

A. The air barrier system shall be protected during construction. Indicate below how the components will be protected (method used), by whom, and when.

Component	Method used for protection	Subcontractor	When
SPF insulation - field of wall			
SPF insulation (wall) - voids / cracks / shims			
SPF insulation - field of roof			
Fluid-applied membrane - Permeable - wall			
Fluid-applied membrane - Impermeable -wall			
Self-adhered membrane - Permeable - wall			

Self-adhered membrane - Impermeable -wall
Self-adhered membrane - Permeable - roof
Self-adhered membrane - Impermeable -roof
Transition membrane - self-adhered
Primer
Mastic / Termination sealant
Air barrier repair:

1.16 AIR BARRIER REPAIR:

A. Discuss how any damage, including but not limited to, accidental holes in the air barrier system, will be repaired - and by whom. Indicate the actual product to be used to perform any repairs in the air barrier components.

Component	Product to be used for repair	Subcontractor responsible
SPF insulation - field of wall		
SPF insulation (wall) - voids / cracks / shims		
SPF insulation - field of roof		
Fluid-applied membrane - Permeable - wall		
Fluid-applied membrane - Impermeable -wall		
Self-adhered membrane - Permeable - wall		
Self-adhered membrane - Impermeable -wall		
Self-adhered membrane - Permeable - roof		
Self-adhered membrane - Impermeable -roof		
Transition membrane - self-adhered		
Primer		
Mastic / Termination sealant		

1.17 INSULATION SECURED TO OR OVER AIR BARRIER MATERIAL

A. Address any concerns or issues of installing insulation over the air barrier material (foundation, walls, and roof), such as preparation, securing, or fastening methods. Delete those that do not apply.

Insulation type	Method for securement	Concerns (if any)
SPF		
XPS		
Polyiso		

EPS
EPX

1.18 COLD FORMED METAL FRAMING - STRUCTURAL (CFMF-S) LOCATIONS

A. Where CFMF-S is a component in the exterior wall assembly, the air barrier installer may need to mark the material itself to indicate where the framing is located. The insulation subcontractor, in turn (when the insulation is not the air barrier), may need to transfer those marks onto the insulation. If any of the above is required, discuss and identify below.

Component	Subcontractor responsible for location marks, if necessary
Sheathing	
Air Barrier	
Insulation	

END OF SECTION 070810.13

SECTION 071113
BITUMINOUS DAMPPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cold-applied asphalt emulsion dampproofing.
   1. Exterior face of all CMU backup in masonry cavity wall construction.
      a. In locations of infill at the existing building.

1.02 RELATED REQUIREMENTS

A. Section 072100 - Thermal Insulation: Rigid insulation board used as perimeter foundation and cavity wall thermal insulation.

1.03 REFERENCE STANDARDS

A. ASTM D 1187 - Standard Specification for Asphalt-Base Emulsions for Use as Protective coatings for Metal.

B. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; 2013.

1.04 SUBMITTALS

A. Product Data: Provide properties of primer, bitumen, and mastics.

B. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

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

1.06 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   1. Euclid Chemical Co.: www.euclidchemical.com
   2. Henry Company; A Carlisle Company : www.henry.com
   3. Karnak Corporation: www.karnakcorp.com/#sle.
   4. Mar-Flex Systems, Inc: www.mar-flex.com/#sle.
   5. MBCC Group; Master Builders Solutions: www.master-builders-solutions.com
   6. W. R. Meadows, Inc: www.wrmeadows.com/#sle.
   7. Premium Liquid Rubber: www.sprayrubber.com

2.02 COLD ASPHALTIC MATERIALS

A. Bitumen: Emulsified asphalt, 1;with fiber reinforcement other than asbestos (Type II).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.

C. Verify that items penetrating surfaces to receive dampproofing are securely installed.

3.02 APPLICATION

A. Apply bitumen by spray application or brush/roller application.

B. Apply bitumen in one coat, continuous and uniform, at a rate of 1.5 to 2.5 gal/100 sq ft .
1. Provide a uniform, dry film thickness of not less than 15 mills. Apply in two coats, if necessary, to obtain required thickness, allowing time for complete drying between coats.

C. Seal items watertight with mastic, that project through dampproofing surface.

END OF SECTION 071113

SECTION 071300
UNDERSLAB SHEET WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Underslab sheet membrane vapor barrier.
   1. Vapor barrier is to be installed beneath the entire interior area of first floor new concrete slab construction and slab infill areas in the existing building.

1.02 RELATED REQUIREMENTS

A. Section 079005 - Joint Sealers: Sealant for joints in substrates.

B. Section 312323 - Fill.

C. Section 334600 - Subdrainage.

1.03 REFERENCE STANDARDS

A. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2010).

B. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2014.

C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting; 2012.

D. ASTM D1709 - Standard Test Method for Impact Resistance of Plastic Film by the Free-Falling Dart Method.

E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

F. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a (Reapproved 2013).

G. ASTM E 1643 - Standard Specification For Installation of Plastic Water Vapor Retarder Used in Contact with Soil or Granular Fill Under Concrete Slabs.

H. ASTM E 1745 - Standard Specification For Plastic Water Vapor Retarder Used in Contact with Soil or Granular Fill Under Concrete Slabs - Class A.

I. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; Fifth Edition, with interim updates.

1.04 SUBMITTALS

A. Product Data: Provide data for vapor barrier and sheet waterproofing membranes, tape, sealants and other system components.

B. Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing and vapor barrier for compliance with requirements, based on testing of current waterproofing formulations.

C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

D. 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 in accordance with NRCA Roofing and Waterproofing Manual.

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

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

D. Source Limitations: Obtain products through one source from a single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver liquid and sheet material to Project site in original packages with seals unbroken, labeled with manufacturers name, product brand name and type, date of manufacture, and directions for storing and mixing other components.

B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by manufacturer.

C. Remove and replace liquid materials that cannot be applied within thief stated shelf life.

D. Store sheets and rolls according to manufacturers written instructions.

E. Protect stored materials from direct sunlight.

1.07 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

B. Do not apply to a damp or wet substrate.

C. Do not apply in snow, rain, fog or mist.

1.08 WARRANTY

A. Contractor shall correct defective Work within a five year period after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.

B. Special Installer's Warranty: Written waterproofing Installer's warranty, signed by the Installer. covering work of this section, for warranty period of two years.

PART 2 PRODUCTS

2.01 MEMBRANE MATERIALS

A. CLEAR, OR WHITE, POLYETHYLENE SHEET PLASTIC WILL NOT BE ACCEPTED UNDER ANY CIRCUMSTANCES.

B. Manufacturers
   1. Underslab Vapor Barrier: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
      a. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
         1) W.R. Meadows, Inc. - Perminator 15 mil - Class A.
      b. Products by other manufacturers may be considered provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect.
         1) Floor Seal Technology, Inc. TruBarrier 15 mil: www.floorseal.com
         2) Insulation Solutions, Inc; Viper II 15 mil: www.insulation solutions.com
         3) Inteplast Group: Barrier Bac IntePlus XF VB-350: www.barrierbac.com
         4) Raven Industries; VaporBlock 15 mil: www.ravenefd.com
         5) Stego Industries LLC; Stego Wrap 15 mil: www.stegoindustries.com
         6) Tex-Trude, LP: Xtreme 15 mil: www.tex-trude.com

7) W.R. Meadows; Perminator 15 mil: www.wrmeadows.com

C. Product Requirements
1. Vapor Barrier: 15 mil vapor retarder.
a. Vapor transmission rate: 0.018 or less.
b. Puncture resistance: ASTM D1709, Minimum 4000 grams.

D. Materials
1. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
a. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
2. Joint Sealing Compounds: Low-viscosity, two component, asphalt-modified sealer. All protrusions (pipes, etc.) Shall have a premolded collar surround to be sealed in place.
3. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.

C. Verify items that penetrate surfaces to receive waterproofing are securely installed.

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

3.02 PREPARATION

A. Protect adjacent surfaces from damage not designated to receive waterproofing.

B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.

C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.

D. Seal cracks and joints with sealant using depth to width ratio as recommended by sealant manufacturer.

E. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.

3.03 INSTALLATION - VAPOR BARRIER

A. Install vapor barrier in accordance with manufacturer's instructions.

B. Roll out membrane, and minimize wrinkles and bubbles.

C. Membrane to cover entire pour area.

D. All vapor barrier joint/seams, both lateral and butt, are to be be overlapped minimum 6 inches and taped using minimum 4 inch wide tape provided by the manufacturer.
1. Tape area of adhesion to be free from dust, dirt and moisture to allow maximum adhesion of tape.

E. Vapor barrier is to be turned up on all vertical foundation walls the full thickness of the concrete slab on grade. Adhere to the walls with an adhesive provided by the manufacturer of the waterproofing sheet.

F. Per manufacturers requirements create collars, made from the vapor barrier material, to seal around all pipe, duct, rebar and conduit/wire penetrations. Tape collars completely.

G. In the event that the vapor barrier is damaged during or after installation, repairs must be made. Cut a pice of vapor barrier material large enough to cover the damage by a minimum overlap of 6 inch in all directions. Clean all adhesive areas and tape.

3.04 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION 071300

SECTION 072100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at perimeter foundation wall.

B. Sprayed-in-place thermal insulation (2 lb.) air barrier system at all exterior cavity wall construction.

1.02 RELATED REQUIREMENTS

A. Section 042000 - Unit Masonry: Supporting construction for insulation..

B. Section 054100 - Cold-Formed Exterior Steel Stud Framing: Supporting construction for sprayed-in-place and batt insulation.

C. Section 061000 - Rough Carpentry: Supporting construction for batt insulation.

D. Section 075400 - Thermoplastic Membrane Roofing: Insulation specified as part of the roofing system.

E. Section 078400 - Firestopping: Fire safing.

F. Section 092116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

G. Sections 23 in regards to duct, equipment and pipe insulation.

1.03 REFERENCE STANDARDS

A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

C. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

1.04 SUBMITTALS

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

B. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Sprayed-in-Place Thermal Insulation:
   1. Provide data on product characteristics, product testing, product performance criteria, and product limitations.
      a. Provide specific data that product is approved for direct application on cmu substrate as part of cmu/masonry veneer cavity wall and/or exterior sheathing as part of the metal stud/sheathing/masonry veneer cavity wall construction.
      b. Provide product data on all auxiliary components; primer, seam tape and transition strip materials.
      c. Provide specific data that product has been tested and is approved for use as an air barrier.
      d. Provide hydrostatic water resistance pressure test results.
      e. Shop Drawings: Indicate locations and extent of sprayed-in-place thermal insulation air barrier system assemblies and details of all typical conditions, intersections with other envelope assemblies and materials, membrane counter-flashings, and details showing how gaps in construction will be bridged, how inside and outside corners are negotiated, how materials that cover the insulation are secured, how air-tight

conditions are maintained, and how miscellaneous penetrations such as conduits, pipes, electric boxes and similar items are sealed.

2. Quality Assurance Program: Provide evidence of current accreditation of the subcontractor and certification of installers under the Air Barrier Association of America's (ABAA) Quality Assurance Program. Provide accreditation and certification information on the form included in the Form of Proposal.

E. Manufacturer certificate, located at the end of this section, to be submitted within 24 hours of the bid, for the proposed sprayed-in-place thermal insulation system confirming that the sprayed-in-place thermal insulation system installer is approved to install the proposed sprayed-in-place thermal insulation system.

1.05 FIELD CONDITIONS

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

1.06 SEQUENCING

A. Sequence work to ensure firestop materials are in place before beginning work of this section.

1.07 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
1. Surface - Burning Characteristics: ASTM E 84.
2. Fire - Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

C. Sprayed-In-Place Thermal Insulation: Current accreditation of the subcontractor and certification of installers in accordance with the Air Barrier Association of America's (ABAA) Quality Assurance Program.
1. Install in accordance with ABAA and training requirements outlined in ULC S705.2-05 Installation Standard.

D. Sprayed-In-Place Thermal Insulation Field Quality Control:
1. ABAA Site Inspections: ABAA to verify conformance with the manufacturers instructions, the ULC S705.2 Installation Standard, the ABAA Quality Assurance Program and requirements of this specification.
   a. Inspections and testing shall be carried out at 50 percent of completed sprayed-in-place thermal insulation. Insulation to be inspected is to have no veneer covering installed. Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.
   b. If the tests reveal any defects, promptly remove and replace defective work at no additional expense to the Owner.
      1) If the preliminary or final written inspection report indicates the system will not or has not passed then an additional ABAA inspection shall be conducted to ensure defects and deficiencies have been corrected and a passing ABAA report can be obtained.

1.08 PRE-INSTALLATION MEETING

A. Preinstallation Meeting: Per Section 042000 - Unit Masonry the general contractor/construction manager will conduct a preinstallation conference prior to the masonry installation occuring. The

sprayed-in-place thermal insulation installer is to attend this preinstallation conference too coordinate the installation of the sprayed-in-place insulation with the masonry subcontractor.

1. Review foreseeable methods and procedures related to sprayed-in-place thermal insulation installation, including but not necessarily limited to the following:
   a. Protection of through wall flashing.
   b. Spray around horizontal reinforcing eyes.
   c. Hot and cold weather protection.
   d. Protection of work in process and installed.
   e. Sequencing of work with masonry installation.
   f. Review percentages of completion, of uncovered sprayed-in-place insulation, when ABAA testing will be conducted.
   g. Has the project been registered with the ABAA for testing?
      1) If registered has the ABAA testing agent been notified?

1.09 MOCK-UP

A. Sprayed-in-place thermal insulation to be included in the mock-up wall construction.

PART 2 PRODUCTS

2.01 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
   4. R-value; 1 inch of material at 72 degrees F: 5, minimum.
   5. Board Thickness at Foundation Wall: 2 inches.
   6. Board Edges: Square.
   7. Thermal Conductivity (k factor) at 25 degrees F: 0.18.
   8. Thermal Resistance: R of 7.5 for 1-1/2 inch.
   9. Compressive Resistance: 25 psi.
   10. Board Density: 1.6 lb/cu ft.
   11. Water Absorption, Maximum: 0.3 percent, by volume.
   12. Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include;
      a. Dow Chemical Company: www.dow.com/sle.
      b. Certainteed Saint Gobain: www.certainteed.com
      c. Kingspan Insulation LLC: www.trustgreenguard.com/#sle.
      d. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
      e. Pactiv Building Products: www.pactiv.com/green-guard/.

2.02 SPRAYED-IN-PLACE THERMAL INSULATION

A. Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      a. NCFI Polyurethanes, Division of BMC: InsulBloc 2 lb. Spray Foam System 11-017.
   2. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect.
      a. NCFI Polyurethanes, Division of BMC: InsulBloc 2 lb. Spray Foam System 11-017: www.ncfi.com
      b. BASF Polyurethane Foam Enterprises, LLC: Walltite 2 lb.Air Barrier System: www.basf-pfe.com

c. Carlisle Spray Foam Insulation: SealTite Pro Closed Cell: www.carlislefi.com
d. Huntsman Building Solutions/ formerly Demilec USA, LLC: Heatlok Soya HFO: www.demilecusa.com
e. Gaco (Holcim): Gaco WallFoam 183M 2 lb.: www.gaco.com
f. Henry Company: Permax 2.0: www.henry.com
g. Huntsman Building Solutions/ formerly Icynene-Lapolla Inc.: ProSeal LE 2 lb. Spray Foam Insulation: www.icynene.com
h. JohnsManville Insulation Systems: JM Corbond III 2 lb.: www.jm.com
i. SWD Urethane: Quik-Shield 112-XC: www.swdurethane.com
j. Xcelus Building Systems, Inc.: Xcelus XLS 2000: www.xcelusbuildingsystems.com

3. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect.
a. NCFI Polyurethanes, Division of BMC: InsulStarLight 1/2 lb. Spray Foam System 11-017: www.ncfi.com
b. BASF Polyurethane Foam Enterprises, LLC: Enertite 1/2 lb.Air Barrier System: www.basf-pfe.com
c. Huntsman Building Solutions/ formerly Demilec APX 1.2: www.demilecusa.com
d. Gaco (Holcim): Gaco WallFoam Open Cell Foam 052N 1/2 lb.: www.gacowallfoam.com
e. Huntsman Building Solutions/ formerly Icynene-Lapolla Inc.: LD-R-50 1/2 lb. Spray Foam Insulation: www.icynene.com
f. JohnsManville Insulation Systems: JM ocSPF 1/2 lb.: www.jm.com

B. Spray applied closed cell, 2 lb. polyurethane foam insulation, air seal and water repellent treatment for CMU cavity wall and cold formed metal stud framed walls throughout the project.
1. Physical material properties shall be:
2. Core Density 1.9-2.2 lb/ft per ASTM D-1622
3. Water Vapor Transmission <1.0 @ 2" thick /perms per ASTM E-96
4. R-Value 6.7 minimum at 1inch thick per ASTM C-518
5. R-Value Aged: 6.4 minimum at 1 inch thick per ASTM C-1029
6. Compressive Strength 25 (min) psi per ASTM D-1621
7. Flame Spread <25 per ASTM E-84
8. Smoke Developed <450 per ASTM E-84
9. Air Leakage - Infiltration: 0.00 @ 1.57 psf/cfm/ft2 per ASTM E-283
10. Air Leakage - Exfiltration: 0.00 @ 1.57 psf/cfm/ft2 per ASTM E-283
11. Air Barrier System Test: ASTM E 2357 and NFPA 285
12. Tensile Bond Strength >45 for masonry psi per ASTM D-1623
13. Hydrostatic Water Pressure Resistance Test: No failure at 56.5 feet head pressure per AATCC 127-1998.

C. Refer to the wall types on the A0.1 drawing sheet for thickness of spray polyurethane material required.

D. Apply spray polyurethane foam directly to the masonry block or exterior sheathing in accordance with the manufacturers installation instructions. All surfaces to be sprayed with foam must be free of moisture and ice.

E. Do not apply spray polyurethane foam during inclement weather or when ambient temperatures and humidity are outside the ranges prescribed by the manufacturer.
1. Optimum Adhesion: Sprayed-In-Place Thermal Insulation Installer to determine appropriate grade of adhesive material to be used on project based on; project type, substrate type, time of year of installation, average daily temperatures forecasted during installation, and other factors, as determined by the sprayed-in-place thermal insulation manufacturer to maintain the specified requirements. No additional compensation will be considered, or due, the sprayed-in-place thermal insulation contractor if the sprayed-in-place thermal insulation

manufacturer requires a tack coat, or the type or grade of adhesive, originally bid, to be changed due to project type, environmental and/or temperature factors, to maintain the specified requirements and construction schedule.

F. Materials:

1. Transition Strip and Seam Tape Primer:
   a. Primer to facilitate adhesion of flashings to fiberglass faced sheathing, concrete and masonry substrates.
      1) Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
         (a) Grace Construction Products: Perm-A-Barrier WB Primer
         (b) W. R. Meadows, Inc.: Mel-Prime
         (c) Product approved for use by sprayed-in-place thermal insulation manufacturer.

2. Seam Tape:
   a. Self-adhered flashing with cross-laminated, high density polyethylene sheet backed with pressure-sensitive rubberized asphalt adhesive.
      1) Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
         (a) Grace Construction Products: Vycor Plus
         (b) W. R. Meadows, Inc.: Air-Shield 25 mil Flashing Tape
         (c) Product approved for use by sprayed-in-place thermal insulation manufacturer.

3. Transition Strip Materials:
   a. Contractor option to use self-adhered sheet product or fluid applied product for the transition strip materials.
   b. Self-adhered Transition Strip Material: Minimum 1 mm self-adhered flashing sheet with cross-laminated, high density polyethylene sheet backed with pressure-sensitive rubberized asphalt adhesive. Install transition strip materials at all wall openings, transitions in substrate and connections to adjacent elements:
      1) Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
         (a) Carlisle Coatings and Waterproofing: CCW-705 TWF
         (b) Grace Construction Products: Perm-A-Barrier Flashing
         (c) Henry: Blueskin SA
         (d) Protective Coatings Technology, Inc.: Poly-Wall Crack Guard
         (e) Tremco, Inc.; ExoAir 110
         (f) W. R. Meadows, Inc.: Air Shield
   c. Fluid-applied Transition Strip Material System: One component rubberized air barrier material. Suitable for spray, roller or brush application direct to substrate. Install by roller/brush in two minimum 13 mil wet thickness applications, or one 26 mil wet thickness application by spray. Provide all additional auxiliary materials necessary to complete the entire system: Reinforced, nonwoven, polyester sheathing joint fabric with preformed corners, polyester-faced 30-mil thick, self-sealing, rubberized asphalt membrane, and water-based primer.
      1) Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
         (a) BASF: Enershield-1, Quick Corner 6, TF Membrane, WS Flashing Primer: www.enershield.basf.com
         (b) Prosoco - R-Guard Fast Flash
         (c) W. R. Meadows, Inc.: Air Shield LM

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 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Adhere a 6 inch wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
   1. Tape seal joints.
   2. Extend sheet full height of joint.

B. Install boards horizontally on foundation perimeter.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and to protrusions.

C. Extend boards over expansion joints, unbonded to foundation on one side of joint.

D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

E. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.

3.03 SPRAYED-IN-PLACE THERMAL INSULATION AIR BARRIER SYSTEM

A. Equipment used to spray insulation shall comply with ABAA ULC S705.2 and the manufacturer's recommendations.

B. Record equipment settings daily as required by the ABAA ULC S705.2 installation standard.

C. Apply in consecutive passes as recommended by manufacturer and thickness indicated on drawings. Passes shall not be less than 1/2 inch and not greater than 2 inches.

D. Install within manufacturer's tolerances, but not more than minus 1/4 inch or plus 1/2 inch.
   1. The total average thickness, tested and provided on the final ABAA Audit Report, for the sprayed insulation installed on the wall in the field shall be the minimum thickness indicated, for the various wall types, as shown on the drawings.

E. Surface of foam insulation to be free of voids and embedded foreign objects.

F. Remove masking materials and overspray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.

G. Trim as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.

H. Complete connections to other components and repair any gaps, holes or other damage using material which conforms to ABAA ULC S710.1 or ABAA ULC S711.1 and installed in accordance with ABAA ULC S710.2 or ABAA ULC S711.2 as applicable.

I. Fill exterior metal stud boxed/beam headers, jambs, and sills at all openings completely with 0.5 lb. spray insulation.

J. Transition Strip and/or Fluid-Applied Material Installation: Install transition strip/fluid-applied materials to provide continuity throughout the building envelope. Install materials in accordance with manufacturer's recommendations and the following:

1. Priming, seam tape/fluid-applied material, and transition strips are required by RossTarrant whether or not they are required by a manufacturer to meet the ABAA air leakage requirements of ASTM E2357.
2. Apply primer for seam tape and transition strips. Allow primer to dry completely before transition strip application. Apply as many coats as necessary for proper adhesion.
3. Position subsequent sheets of transition strips applied above so that membrane overlaps the membrane sheet below by a minimum of 2 inches, unless greater overlap is required by manufacturer. Roll into place with roller.
4. Overlap horizontally adjacent pieces of transition strips a minimum of 2 inches, unless greater overlap is required. Roll seams with roller.
5. Seal around all penetrations with a transition strip or other procedure.
6. At changes in substrate plane, provide transition material to make a smooth transition from one place to another.
7. Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to make a smooth transition from one plane to another. Membrane shall be continuously supported by substrate.
8. At through-wall flashings, provide an additional 6 inch wide strip of membrane counterflashing to seal top of through-wall flashing to membrane. Seal exposed top edge of strip with bead of mastic.
9. At deflection and control joints, provide backup for the membrane to accommodate anticipated movement.
10. At expansion and seismic joints provide transition to the joint assemblies.
11. At the top of parapet walls, provide transition material over top of parapet to transition with roof membrane.
12. Do not allow materials to come into contact with chemically incompatible materials.
13. Do not expose transition membrane to sunlight longer than recommended by manufacturer.
14. Inspect installation prior to enclosing assembly and repair damaged areas with sprayed-in-place thermal insulation air barrier system.

3.04 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION 072100

SECTION 072100.01
SPRAYED-IN-PLACE THERMAL INSULATION (072100) INSTALLER'S CERTIFICATION

SPRAYED-IN-PLACE THERMAL INSULATION (072100) INSTALLER'S CERTIFICATION

This certification must be completed and submitted as outlined in the Supplemental Instructions to Bidders. Failure to submit this completed certification may be cause for rejection of the bidder's proposal. Upon submittal of this form RossTarrant will verify from the ABAA website (www.airbarrier.org) the listed installers current and valid certification, at the time of bid, with the ABAA. Installers listed without current and valid ABAA certification will be rejected.

This certification must be completed and submitted within 24 hours after bids are received.

Date Submitted:_____

Name & Address of Sprayed-In-Place Thermal Insulation Installer:

_____

_____

_____

I certify that _____ (Name of Sprayed-In-Place Thermal Insulation Installer) has achieved ABAA Accreditation for sprayed-in-place thermal insulation installation, and is a member with current and valid ABAA Certification.

ABAA Accreditation Number_____

I certify that _____ (Name of Sprayed-In-Place Thermal Insulation Subcontractor) installers have achieved ABAA Certification for sprayed-in-place thermal insulation installation, and is a member with current and valid ABAA Certification.

ABAA Certification Numbers_____

_____

_____

_____

_____

Signed:_____Title: _____

SECTION 072129
SPRAYED-ON ACOUSTICAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cellulose insulation applied to underside of structure.
   1. Locations indicated in the drawings: #A-105 Multi-Purpose.

1.02 RELATED SECTIONS

A. Section 099000 - Painting and Coating: Field paint finish.

1.03 REFERENCE STANDARDS

A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.

B. ASTM C739 - Standard Specification for Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation; 2011.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

D. ITS (DIR) - Directory of Listed Products; current edition.

E. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

F. ASTM C-1149 Spray-applied Cellulose Insulation.

G. ASTM C-423 - Sound Absorption and Sound Absorption Coefficients by the reverberation room method.

1.04 SUBMITTALS

A. Product Data: Provide data on materials, describing insulation properties.

B. Samples: Samples of manufacturers standard color selection. Submit actual samples not photo reproductions.

C. Independent laboratory test reports evidencing compliance with specified performance criteria.

D. Manufacturer certificate, located at the end of this section, to be submitted with the bid, for the proposed sprayed-on acoustical system confirming that the sprayed-on acoustical system installer is approved to install the proposed sprayed-on acoustical system.

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

C. Products Specified by Flammability Criteria: Listed and classified by ITS (DIR), UL (DIR), or authorities having jurisdiction (AHJ).
   1. Surface burning characteristic -ASTM E 84, Class I, Class A.
   2. Flame Spread: Maximum 15
   3. Smoke Developed: Maximum 0

D. Product to comply with ASTM C-423 Sound Absorption and Sound Absorption Coefficients by the reverberation room method.

E. Product to comply with ASTM C-1149 Spray-applied Cellulose Insulation.

1.06 FIELD CONDITIONS

A. Do not install insulation, when ambient and surface temperatures are lower than 50 degrees F.

B. Maintain acceptable ambient and substrate surface temperatures prior to, during, and after installation of primer and insulation materials and overcoat.

1.07 PROJECT CONDITIONS

A. Apply insulation after hangers and supporting clips are installed but before subsequent construction is erected.

B. Maintain required minimum building temperature as recommended by the manufacturer before, during and after application of sprayed insulation.

1.08 DELIVERY STORAGE AND HANDLING

A. Deliver materials to the project in manufacturer's unopened packages, fully identified as to trade name, type and other identifying data.

B. Store materials above ground, in a dry location, protected from the weather. Damaged packages found unsuitable for use should be rejected and removed form the job site.

C. Protect liquids from freezing.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cellulose Fiber: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the Work include:
   1. GreenFiber: www.greenfiber.com.
   2. International Cellulose Corp: www.spray-on.com.
   3. ThermoCon, Inc: www.thermocon.com.
   4. Isolatek International, Inc.: www.isolatek.com

B. Basis of Design: The design concept and the specifications indicate the requirements and aesthetics of the K-13 ceiling system by International Cellulose Corp.

2.02 MATERIALS

A. Cellulose Fiber Insulation: ASTM C739; treated cellulose fiber.
   1. Spray-on Acoustic Insulation to be asbestos free material composed of cellulose fibers, chemical treatment, and binding system designed to be spray-applied, permanently bonding to substrate. Material to have firm abrasion resistant surface that will not chip, shed, flake, dust or be subject to rot.
   2. Thermal Resistance (R-value): 3.9, at 1 inch thick when tested in accordance with ASTM C177 at 75 degrees F temperature
   3. Density: 2 lb/cu ft, when tested in accordance with ASTM D1622/D1622M.
   4. NRC: 0.80 for 1 inch average thickness per ASTM C-423.
   5. Moisture Absorption: Maximum 15 percent by weight.
   6. Flame Spread / Smoke Developed Index: 0-25 / 0-450, Class A, when tested in accordance with ASTM E84.
   7. Combustibility: Passing ASTM E136.
   8. Bond Strength: Greater than 900 psf according to ASTM E-736
   9. Compression Strength: Greater than 600 psf according to ASTM E-761.
   10. Color: Selected by Architect from manufacturers standard colors and Refer to Room Finish Schedule for painting notes.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are clean, dry, and free of matter that may inhibit adhesion.

B. Verify other work on and within spaces to be insulated is complete prior to application.

C. Coordinate installation with other trades whose work may be affected or have an effect on the insulating process. All work by other trades that will be concealed by insulation must be inspected and approved by those having jurisdiction before work may proceed.

3.02 PREPARATION

A. Carefully examine all surfaces to receive spray-on insulation. Substrate shall be free of dirt, rust, grease, oil, loose material, frost or other matter which would affect bond of sprayed insulation.

B. Mask and protect adjacent surfaces from overspray or damage.

C. Apply sealer/primer in accordance with manufacturer's instructions to prevent migratory staining of the acoustical insulation.

D. Clips, hangers, supports, sleeves and other attachments to the substrate are to be placed by others prior to the application of sprayed insulation materials.

3.03 INSTALLATION

A. Install sprayed insulation in accordance with manufacturer's instructions.

B. Install sprayed insulation to a uniform monolithic density without voids.

C. Install K-13 to a minimum cured thickness of 1 inch.

D. Equipment, mixing and application shall be in accordance with the manufacturer's written application instructions.

E. The application of sprayed insulation to the underside of roof decks shall not commence until the roofing is completley installed and weathertight and after roof traffic has ceased.

F. Provide masking, drop cloths or other suitable coverings to prevent insulation overspray from coming in contact with surfaces not intended to receive spray-applied insulation. Apply insulation on underside of roof/floor deck only. All other parts of the trusses, joists or the steel members are to be masked off to prevent over spray from coming in contact.. The following exception applies:

1. Contractor option to spray the top chord of joists/trusses, top flange of steel members, or other steel members supporting the roof/floor deck with the same thickness of insulation material as specified for the roof/floor deck. All other parts of the trusses, joists or other steel members are to be masked off to prevent insulation over spray from coming in contact..
2. Sprayed-on acoustical insulation subcontractor and painting subcontractor to coordinate the painting and insulation spraying sequence, and steel items to be either painted or insulated.

G. Upon completion of application, remove any overspray, debris and waste from floors, walls, structure items, and adjacent areas. Leave the work area in a broom clean condition.

H. Assure ventilation across the surface of the sprayed insulation during and after application to accelerate drying.

3.04 PROTECTION

A. Do not permit subsequent construction work to disturb applied sprayed insulation.

B. No activity shall be allowed on any roof deck surface on which the underside has been treated with sprayed-on insulation until the product is completely cured.

3.05 REPAIR AND CLEANING

A. All patching and repair to sprayed insulation due to damage by other trades shall be performed under this section and paid for by the trade responsible for the damage.

B. Upon completion of repair application, remove any overspray, debris and waste from floors, walls, structured items, and adjacent areas. Leave the work area in a broom clean condition.

END OF SECTION 072129

SECTION 072129.01
SPRAYED-ON ACOUSTICAL INSULATION MANUFACTURER'S CERTIFICATION

PART 1 GENERAL

1.01 SPRAYED-ON ACOUSTICAL INSULATION MANUFACTURER'S CERTIFICATION

This certification must be completed and submitted as outlined in the Supplemental Instructions to Bidders. Failure to submit this completed certification may be cause for rejection of the bidder's proposal.

A. This certification must be completed and submitted within 24 hours after bids are received.

Date Submitted:_____

Name & Address of Sprayed-On Acoustical Insulation Manufacturer:

_____

_____

_____

Name & Address of Sprayed-On Acoustical Insulation Installer:

_____

_____

_____

I certify that _____ (Name of Sprayed-On Acoustical Insulation Installer) is an approved applicator of our Sprayed-On Acoustical Insulation.

Signed:_____Title: _____

(Sprayed-On Acoustical Insulation Manufacturer)

END OF SECTION 072129.01

SECTION 074213
METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured metal panels for walls, with subgirts/z-furring, related flashings and accessory components.

1.02 RELATED REQUIREMENTS

A. Section 072100 - Thermal Insulation.

B. Section 077100 - Roof Specialties.

C. Section 092116 - Gypsum Board Assemblies: Hat channels for soffit panel support.

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; 2015.

B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).

1.04 DESIGN REQUIREMENTS

A. Maximum Allowable Deflection of Panel: 1/180 of span.

B. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.

C. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

D. Products: Provide continuity of thermal barrier at building enclosure elements .

E. Provide continuity of air barrier and vapor retarder seal at building enclosure elements in conjunction with materials specified in Section 072500.

1.05 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Summary of test results, indicating compliance with specified requirements.
   2. Storage and handling requirements and recommendations.

B. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.

C. Selection Samples: For each panel system specified, submit color chips representing manufacturer's full range of available colors and patterns. Submit actual samples not photo reproductions.

D. Warranty Information: Submit specified manufacturer's 20 year finish warranty.

1.06 QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.

1.07 MOCK-UPS

A. Metal wall panel and trim to be included in the mock-up wall construction.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.

B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.

C. Prevent contact with materials that may cause discoloration or staining of products.

1.09 WARRANTY

A. Manufacturer's Warranty: Correct defective work within a 20 year period after Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.

B. Installer's Warranty: Correct defective Work within a 5 year period after Substantial Completion, including defects in integrity of seals.

C. Finish Warranty: Manufacturer's 20-year finish warranty stating products to be free of corrosion, checking, crazing, chalking, discoloring, fading, oxidation, and that exposed finish surface will not peel, crack, chip, or spall.
   1. Excessive color change/fading greater than 5 NBS (Hunter) units and passing 5000 hrs per ASTM D 2249-85, ASTM D 2244 and ASTM D 822-85 respectively.
   2. Chalking shall not be less than a rating of No. 8 per ASTM D 659 and ASTM D 4214.
   3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:

B. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
   1. Panel Type: DMI FP10-12.

C. Products by other mnaufacturers may be considered provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect.
   1. ACI Building Systems; ACI Metal Roofing Systems: www.acibuildingsystems.com
   2. Architectural Building Components : www.archmetalroof.com.
   3. ATAS International, Inc : www.atas.com.
   4. Berridge: www.berridge.com
   5. Nucor IPG/Centria: www.centria.com
   6. DMI: www.dmimetals.com
   7. Drexel Metal Products, Inc., A Carlisle Company: www.drexmet.com
   8. Englert: www.englertinc.com
   9. Firestone Metal Products: www.unaclad.com
   10. Innovative Metals Co. : www.imetco.com
   11. Cornerstone Building Brands/MBCI: www.mbci.com
   12. Merchant & Evans: www.ziprib.com
   13. Morin Corporation: www.morincorp.com
   14. Petersen Aluminum Corporation: www.pac-clad.com.

2.02 MANUFACTURED METAL PANELS

A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.

1. Provide exterior wall panels, soffit panels, and subgirt framing assembly.
2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
3. Maximum Allowable Deflection of Panel: L/180 for length(L) of span.
4. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
5. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
6. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.

B. Exterior Wall Panels:
1. Profile: Vertical; style as indicated.
2. Side Seams: Double-interlocked, tight-fitting, sealed with continuous gaskets. Metal panels shall be fabricated from zinc coated steel conforming to ASTM A 653 SQ, Grade 37, G90 coating.
3. Material: Precoated steel sheet, 22 gauge, 0.0299 inch minimum thickness.
4. Panel Width: 12 inches.
5. Panel Texture: Smooth

C. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.

D. Anchors: Galvanized steel.

E. Metal panels shall be fabricated from zinc coated steel conforming to ASTM A 653 SQ, Grade 37, G90 coating. Steel panel shall be 22 gauge with smooth surface texture.

F. All exterior flashing and trim shall be fabricated in the same material, gauge, finish and color as the exterior profile, unless otherwise indicated.

G. Subgirts and/or Z-furring shall be fabricated from minimum 16 gauge zinc coated steel conforming to ASTM A 653 SQ, Grade 37, G90 coating. Depth as indicated on the drawings. On-center spacing per requirements of metal wall panel manufacturer.
1. Manufacturers: Subject to compliance with requirements manufacturers offering the following products that may be incorporated into the work include;
a. Metal Subgirts and Z-Furring:
1) ClarkDietrich: www.clarkdietrich.com
2) Flexospan Steel Buildings, Inc.: www.flexospan.com
3) Johnson Brothers Metal Forming Co.: www.johnsonrollforming.com
4) J. N. Linrose Manufacturing LLC: www.jnlinrose.com
5) Telling Industries, LLC: www.tellingindustries.com.
6) Monarch Metal, Inc.: www.monarchmetal.com

2.03 MATERIALS

A. Precoated Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, Structural Steel (SS) or Forming Steel (FS), with G90/Z275 coating; continuous coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.

B. Fluoropolymer Coating System: Manufacturer’s standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss as selected from manufacturer’s standards, in a minimum of 20 colors. Minimum color selction to be equal to or greater than manufacturers list of standard colors for 24 gauge metal wall panel and (steel or aluminum) soffit panel with same materila lead times and no minimum on square footage requirements.

C. Panel Back Coating: Panel manufacturer's standard polyester wash coat.

2.04 ACCESSORIES

A. Sealants:
   1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
   2. Concealed Sealant: Non-curing butyl sealant or tape sealant.

2.05 FABRICATION

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

B. Form pieces in longest practicable lengths.

C. Form panels for flush seams.

D. Panels: Provide factory fabricated panels and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
   1. Panels to be manufactured on a fixed base, multi-station roll former with a minimum of 26 stations.
   2. Coil to be tension leveled prior to being received by the panel manufacturer.
   3. Metal coil to be tension leveled by the panel manufacturer prior to the start of panel fabrication.

E. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building framing members are ready to receive panels.

3.02 INSTALLATION

A. Install panels on walls and soffits in accordance with manufacturer's instructions.

B. Protect surfaces in contact with dissimilar metals with bituminous paint. Allow to dry prior to installation.

C. Fasten panels to structural supports; aligned, level, and plumb.

D. Locate joints over supports.

E. Provide expansion joints where indicated.

F. Use concealed fasteners unless otherwise approved by Architect.

G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.03 TOLERANCES

A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

3.04 CLEANING

A. Remove site cuttings from finish surfaces.

B. Remove protective material from wall panel surfaces.

C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION 074213

SECTION 075400
THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fully adhered PVC membrane roofing system.

B. Insulation: flat and tapered.

1.02 RELATED REQUIREMENTS

A. Section 024119 - Selective Structure Demolition: Roof system demolition.

B. Section 061000 - Rough Carpentry: Roof blocking, parapet sheathing.

C. Section 077100 - Manufactured Roof Specialties: Fascia and Reglets and Counterflashing.

D. Section 077200 - Roof Accessories: Guardrails.

E. Section 092116 - Gypsum Board Assemblies: Parapet sheathing.

1.03 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

1.04 REFERENCE STANDARDS

A. ASCE/SEI 7-10 - Minimum Design Loads for Buildings and Other Structures: Wind design.

B. ASTM C728 - Standard Specification for Perlite Thermal Insulation Board; 2013.

C. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.

D. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

E. ASTM D6630 - Standard Guide for Low Slope Insulated Roof Membrane Assembly; current edition.

F. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim update

G. UL (RMSD) - Roofing Materials and Systems Directory; Underwriters Laboratories Inc.; current edition.

H. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

I. UL 580 - Tests for Uplift Resistance of Roof Assemblies ; current edition.

J. UL 1897 - Uplift Tests for Roof Covering Systems; current edition.

1.05 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. ASCE 7-10: Provide thermoplastic membrane, base flashings, and component materials that meet the wind design requirements a as part of a roofing system, as applicable.
   1. Refer to the structural drawings for wind speeds, building exposure, and building risk category.

D. UL Listing: Provide thermoplastic sheet roofing system and component materials that have been tested for application and slopes indicated and are listed by Underwriters Laboratories, Inc. (UL) for Class A external fire exposure.
   1. Provide roof-covering materials bearing UL Classification Marking on bundle, package, or container indicating that materials have been produced under UL's Classification and Follow-up Service.
   2. Provide thermoplastic sheet roofing system that has been tested in accordance with UL 580 or UL 1897.

E. Insulation Fire-Performance Characteristics: Provide insulation materials that are identical to materials whose fire-performance characteristics have been determined for the assemblies of which the insulation materials are a part, per test method listed below, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
   1. Surface Burning Characteristics: ASTM E 84.
   2. Fire Resistance Ratings: ASTM E 119.

F. All material, the installation thereof shall meet or exceed the minimum criteria of the Kentucky State Building Code.

1.06 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
   1. Base flashings and membrane terminations.

C. Samples for Verification: For the following products:
   1. 3 by 3 inch (300 by 300 mm) square of sheet roofing, of color(s) specified, including T-shaped side and end lap seam.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing systems to maintain warranty.
   1. add a choice

E. Qualification Data: For Installer and manufacturer.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

G. Warranties: Special warranties specified in this Section.

H. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

I. Wind Uplift Design: Provide wind uplift calculation that include wind uplift performance tested per ASCE 7-10 Envelope Procedure. Calculations to include:
   1. Minimum Design Wind-Resistance Loads: Include field of roof, perimeter, and corner uplift pressures for each applicable roof area.
   2. Fastener pattern, spacing, and/or enhanced adhesive requirements.
   3. Additional wind uplift safety factors required by the building area, size or shape, and manufacturers requirements to meet the specified warranty requirements.

J. Manufacturer certificate, located at the end of this Section, to be submitted within 24 hours of the bid, for the proposed PVC roof system confirming that the PVC roof system installer is approved to install the proposed PVC roof system.

1.07 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

B. Manufacturer Qualifications:
1. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.
2. Obtain primary products, including each type of roofing sheet, bitumen, membrane flashings, and vapor retarder (if any), from a single manufacturer. Provide secondary products as recommended by manufacturer of primary products for use with roofing system specified.

C. Installer Qualifications: Engage an experienced installer to perform Work of this Section who has specialized in installing roofing that is required for this Project; who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's products; and who is eligible to receive the project specific full system roofing manufacturer's warranty as specified. A minimum of five (5) years experience with the manufacturer and the specified system is required.
1. Installer's Field Supervision: Require Installer to maintain a full-time supervisor/foreman on job site during times that PVC sheet roofing work is in progress and who is experienced in installation of roofing systems similar to type and scope required for this Project. A minimum of four (4) years experience with the manufacturer and the specified system is required.

D. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.

E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

F. Preinstallation Conference: Conduct conference at Project site. Comply with requirements in Division 1 Section "General Requirements." Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
    a. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
    b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    c. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
    d. Manufacturer's technical representative to be on site during first day of installation.

1.08 PRE-INSTALLATION MEETING

A. Convene one week before starting work of this section.

B. Review preparation and installation procedures and coordinating and scheduling required with related work.

C. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at project site. Meet with Installer (Roofer), installers of substrate construction (roof decks) and other work adjoining roof system including penetrating work and roof accessories, Architect, Owner, and representatives of other entities directly concerned with performance of roofing system including (as applicable) Owner's insurers and test agencies. This meeting must be attended by the on site Foreman overseeing the work.
   1. Review requirements (Contract Documents), submittals, status of coordinating work, availability of materials, and installation facilities and establish preliminary installation schedule. Review requirements for inspections, testing, certifications, forecasted weather conditions, governing regulations, insurance requirements, and proposed installation procedures.
   2. Discuss roofing system protection requirements for construction period extending beyond roofing installation. Discuss possible need for temporary roofing.
   3. Record discussion, including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

D. Preapplication Roofing Conference: Approximately 2 weeks before scheduled commencement of sheet roofing installation and associated work, meet at Project site with Installer, installer of each component of associated work, installers of roof drains, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, test agencies, and governing authorities.
   1. Meet with Owner; Architect; Owner's insurer, if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:
      a. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.
      b. Review structural loading limitations of steel deck and inspect deck for loss of flatness and for required mechanical fastening.
      c. Review roofing system requirements (drawings, specifications, and other contract documents).
      d. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
      e. Review required submittals, both completed and yet to be completed.
      f. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
      g. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
      h. Review required inspection, testing, certifying, and material usage accounting procedures.
      i. Review temporary protection requirements for roofing system during and after installation.

j. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
k. Review of roof observation and repair procedures after roofing installation.

3. Record (Contractor) discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

1.09 COMPLETION MEETING

A. A meeting shall be held at the completion of the project and attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the Manufacturer's representative. The Contractor shall complete all punch list items and acquire Manufacturer's warranty for final submittal to Architect.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.11 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

A. Existing Roof Warranty: Existing PVC roof membrane is still covered by the original special project full system, 20 year NDL, warranty. Roofing contractor to perform new roof membrane tie-in work to maintain existing warranty.
1. Seaman Corporation/Fibertite Warranty Serial No.: 20230916.
2. Effective date 11/27/2023 through 11/27/2043.

B. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents. Three executed copies of all warranties must be submitted to the Architect.

C. Special Project Full System Warranty:
1. The entire installation from the deck up, including but not limited to insulation, fasteners, roofing membranes, edge metals, counter flashing, base flashings and other components of the membrane roofing system, shall be warranted against defects in material and workmanship as evidenced by leaks, flashing membrane deterioration, blisters, splits, etc., as required to maintain roofing system in a watertight condition for the period stated below starting from the date of final acceptance by the Owner. Should leak occur, the Manufacturer shall repair or replace the roof materials as required, to provide a watertight condition, at its own expense, with no dollar limit (NDL)or prorated amount. The warranty shall cover fully

and completely the entire roofing system and the requirements as specified herein. Particularly warranty shall not include language releasing manufacturer of responsibility if not installed by approved roofing Contractor or in accordance with manufacturer's specifications, or materials not specifically made by the manufacturer. It is the manufacturer's responsibility to know by whom and how roofing was installed to eliminate this. The guarantee is for a complete system and shall not be limited by any previous work accomplished on the roof prior to this contract and elected to remain as a part of the system herein specified:

a. Total Systems Warranty shall be for a period of twenty (20) years NDL from the date of substantial completion.
b. This warranty shall be jointly signed by the Manufacturer of the primary roofing material and the authorized installer.
c. Repairs and replacements required because of events beyond the Contractor's/Installer's/ Manufacturer's control and beyond the limits specified herein shall be completed by the Contractor/Installer and paid for by the Owner.

D. Installer shall provide a typed certificate stating the following:
1. Type of roof.
2. Installer.
3. Installer's address and telephone number.
4. Manufacturer
5. Manufacturer's address and telephone number.
6. Who to contact in case of roof failure.
7. Warranty period with beginning and ending dates. Certificate shall be framed and bolted (not hung) on the wall as directed by Architect. Copies of certificate shall be included with manufacturer's written warranty and submitted to Architect.
8. Any representative who inspects roof must copy all inspection reports to the office of RossTarrant Architects, Inc. for the life of the roof.

E. Warranty Work: All warranty and/or maintenance work shall be documented by the individual performing the work with before and after pictures of the work and a detailed breakdown of cost. Submit to the Owner and the Architect. Time spent by the Architect for manufacturer warranty problems shall be billed to the manufacturer.

F. Recommended Maintenance: In addition to the guarantee, the Contractor shall furnish to the Owner the Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.
1. Arrange for a meeting of the Owner, Architect, Manufacturer, and Installer to review procedure for general maintenance by the Owner that will not void warranty, as well as procedure for reporting roof problems, maintenance, and/or warranty problems to manufacturer.
2. All warranty and/or maintenance work shall be documented by the individual performing the work with before and after pictures of the work and detailed breakdown of cost. Submit to Owner and Architect time spent by Architect for manufacturer's warranty problems shall be billed to the manufacturer.

G. Contractor's Warranty: Roofing Contractor shall provide a written two (2) year warranty for materials and workmanship commencing with the date of substantial completion. The warranty shall cover all labor and all material necessary to maintain complete water tightness, including that required to repair and all roof leaks and water infiltration through the roof, flashings, and wall copings in any configuration including standing water at no additional cost to the Owner.

1.13 PROJECT FOREMAN/CONTRACTOR CERTIFICATION

A. Both the project Foreman and the Contractor shall provide a sworn notarized statement to the Owner and the Architect that the entire roofing system has been fully and completely integrated with the

through-wall flashing system following industry standards for a permanent watertight integrated system. All means, methods, materials and labor to perform this integration is fully a part of this contract.

PART 2 PRODUCTS

2.01 PVC SHEET ROOFING MEMBRANE

A. Manufacturer: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements, aesthetics, and formulations of the following:
      a. Seaman Corporation/Fibertite
   2. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect:
      a. Carlisle Syn-Tec: Sure-Flex KEE HP 60 Mil MIN: www.carlisle-syntec.com
      b. Holcim Group/Elevate (formerly Firestone Building Products Company): www.holcimelevate.com.
      c. Seaman Corporation/Fibertite: www.fibertite.com
      d. Johns-Manville: JM60 Mil/60 Mil MIN: www.jm.com
      e. Sika Sarnafil, Inc.: www.usa.sarnafil.sika.com
      f. Siplast: www.siplast.com
      g. Soprema: Sentinel P150: www.soprema.us.com

B. Due to differences in roofing manufacturer standards for membrane reinforcement provisions for fiberglass and polyester are included. Reinforcements listed below are acceptable and manufacturers are to provide their standard of one listed below:
   1. PVC sheet ASTM D 4434, Type II, Grade 1, fiberglass reinforced for fully adhered installation.
   2. PVC Sheet ASTM D4434, Type III, Grade 1, polyester fiber reinforced for fully adhered installation.

C. Thickness: Specified thickness 60 mils MINIMUM thickness as required to meet the specified warranty period.

D. Exposed Face Color for Field of Roof: White.

E. Exposed Face Color for Vertical/Parapet Walls: White.

2.02 INSULATION

A. General: Rigid roof insulation used for this project shall be UL and FM/ASCE approved. Each type of insulation used shall be approved in writing by the insulation manufacturer for intended use, and for use with the specified roof assembly.

B. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C 1289, Type II, Class 1, cellulose felt or glass fiber mat both faces; Grade 2, and with the following characteristics:
   1. Compressive Strength: 20 psi
   2. Board Size: 48" x 48" inch.
   3. Board Thickness: 2-1/2" inch.
   4. Layers: Provide two layers.
   5. Thermal Resistance: Aged R-value of minimum 5.7 per inch. ASTM C518 aged "R" value at 75 degrees F (or RIC/TIMA Conditioning Procedure 281-1).
   6. Board Edges: Square.
   7. Joints: Joints in second layer shall not coincide with joints of the first layer. The course shall be staggered to ensure this.
   8. UL : Class A.

9. Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   a. Atlas Roofing Corporation: www.atlasroofing.com.
   b. Carlisle SynTec: www.carlislesyntec.com
   c. Dow Chemical Co: www.dow.com.
   d. GAF Materials Corporation: www.gaf.com.
   e. Hunter Panels: www.hpanels.com
   f. Johns Manville: www.jm.com.
   g. Elevate/Firestone Building Products Company: www.holcimelevate.com
   h. R-Max.: www.rmaxinc.com
   i. Sika Sarnafil, Inc.: www.usa.sarnafil.sika.com
   j. Soprema: www.soprema.com
   k. Other manufacturers approved by roofing manufacturer to meet full system warranty requirements.

C. Tapered Insulation Board: Roof insulation system of tapered panels composed of closed cell polyisocyanurate, which are bound with fiber glass reinforced facers on both sides. Provide panels that are in full compliance with ASTM C 1289, Type II, Class 1, Grade 2, 20 psi. The panels shall provide for a roof slope of one quarter (1/4) inch per foot.

D. Tapered Pre-Cut Crickets: Roof insulation system of tapered panels composed of a foam core which are bound with fiber glass reinforced facers on both sides. Provide panels that are in full compliance with ASTM C 1289, Type II, Class 1, Grade 2, 20 psi. . The panels shall provide for a roof slope of one quarter (1/4) inch per foot.

E. Insulation Fasteners: Provide insulation fasteners and plates that are ASCE 7-10 approved and/or approved by the manufacturer of the primary roofing products. The insulation fasteners shall provide attachment required to meet the specified uplift performance and to restrain the insulation panels against the potential for digging, etc. The fastening pattern for each insulation panel to be used shall be as recommended by the insulation manufacturer and approved by the manufacturer of the primary roofing products.
   1. Metal Decks: Provide insulation mechanical fasteners and metal plates for metal decks that have been factory coated for corrosion resistance, and when subjected to 30 Kesternich cycles, must show less than 100% red rust, conforming to ASCE 7-10. Acceptable insulation fasteners types for metal decks are listed below:
      a. A single unit, precision formed, fluorocarbon coated screws type roofing fastener having a minimum of one hundred seventy-two thousandths (.172) inch diameter shank and a minimum two hundred-twenty-thousandths (.220) inch diameter thread. All plates used with fastener shall be a metal type having a minimum three (3) inch diameter as supplied by the fastener manufacturer.
         1) Manufacturers: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include;
            (a) ITW Buildex/OMG Inc. - Roofgrip with Buildex Metal Plates.
            (b) Construction Fasteners, Inc. - Dekfast #12 with Dekfast Hexagonal Plates.
            (c) Olympic Fasteners - #12 Standard Roofing fastener.

F. Insulation Adhesive: Insulation installed over the mechanically fastened base/first layer of insulation board.
   1. Provide a ASCE7-10 approved and/or approved by the manufacturer of the primary roofing products insulation adhesive or low-rise foam adhesive. Low-rise bead/ribbon spacing to meet ASCE wind speed and warranty requirements as specified elsewhere in this section

2.03 ROOF COVER BOARD

A. Roof Cover Board: Contractors option to use one of the following products to meet specified warranty requirements:
   1. Thickness of the roof cover board as required by the roofing membrane manufacturer to meet the warranty requirements. Deletion of the cover board is not allowed, even if manufacturers warranty requirements do not require a cover board.
      a. Acceptable Products: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
         1) Georgia Pacific - DensDeck Prime Roof Board
            (a) Private label/distributed by Carlisle as DensDeck.
         2) USG - Securock Gypsum-Fiber Roof Board
            (a) Private label/distributed by Carlisle as Securock.
      b. High-density polyisocyanurate bonded to mineral surfaced, fiber glass-reinforced facers. Tested per ASTM C1289, Type II, Class 4.
         1) Additional Acceptable Product: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
            (a) Johns Manville - Invinsa Roof Board - 1/4 inch thick: www.jm.com
            (b) Carlisle SecurShield HD Plus Polyiso - 1/2" inch thick.

B. Roof Cover Board - Adhesive - Cover board installed over fully adhered insulation.
   1. Provide a ASCE7-10 approved and/or approved by the manufacturer of the primary roofing products insulation adhesive or low-rise foam adhesive. Low-rise bead/ribbon spacing to meet ASCE wind speed and warranty requirements as specified elsewhere in this section

2.04 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
   1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.
   1. Sheet flashing membrane sheet is not required to have fleece backing unless required by manufacturer.
   2. Felt Sheet: Provide 9 oz. felt sheet to be fully adhered to parapet walls or other vertical surfaces.

C. Roof Membrane and Flashing Bonding Adhesive: Manufacturer's standard water or solvent-based bonding adhesive for field membrane, and solvent-based bonding adhesive for base flashings.
   1. Solvent-Based Properties and Characteristics
      a. High strength solvent based contact adhesive allowing bonding to porous and non-porous substrates.
      b. Base: Synthetic rubber.
      c. Solids: 24.2%
      d. Flash Point: 16 degrees F closed cup
      e. Brookfield Viscosity: 2700 Centipoises
         1) Acceptable products, compatible with manufacturers roof membrane and installation system:
            (a) Carlisle - Sure-Flex PVC Bonding Adhesive
            (b) JM - PVC Membrane Adhesive - Solvent Based
            (c) Sika Sarnafil - Sarnacol 2170
   2. Water-Based Properties and Characteristics:
      a. Acceptable products, compatible with manufacturers roof membrane and installation system:

1) Sika Sarnafil - Sarnacol 2121
2) JM - PVC Membrane Adhesive - Water Based

3. RossTarrant Architects will not accept any membrane or field flashing adhesives other than the solvent-based or water-based adhesives described in this specification. Single or multi-component low-rise foams, urethanes, or any other type of single or multi-component adhesives will not be substituted or accepted.

D. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

E. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
1. Provide “Sarnastop,” or equivalent, termination bar at areas where parapet walls occur.

F. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470/ASCE 7-10, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

H. Tapered Polyisocyanurate Edge Strip: Provide tapered polyisocyanurate on top of blocking at parapets with fascia. Tapered panels composed of closed cell polyisocyanurate, which are bound with fiber glass reinforced facers on both sides. Provide panels that are in full compliance with ASTM C 1289, Type II, Class 1, Grade 2, 20 psi. The panels shall provide for a slope of one quarter (1/4) inch per foot.
1. Atlas Roof Insulation: Gemini Tapered Edge Strip

I. Tapered and Flat Polyisocyanurate Board at Roof Drain Sumps: Provide tapered and flat polyisocyanurate insulation in the roof drain sump. Tapered and flat panels composed of closed cell polyisocyanurate, which are bound with fiber glass reinforced facers on both sides. Provide panels that are in full compliance with ASTM C 1289, Type II, Class 1, Grade 2, 20 psi. The tapered panels shall provide for a slope of one quarter (1/4) inch per foot.

J. Walkway Pads: Provide walkway pads/roll in locations as shown on the drawings. Provide maximum 6 inch space between each pad/roll to allow for water drainage. Contractor's option to use pad or roll product.
1. Pad/Roll: Minimum 30 inch x 30 inch, or minimum 30 inch x 4 foot, 60 mil, fiberglass reinforced material with non-slip surface pattern. Fully adhere center and heat weld entire perimeter of pad. Color to be Light Gray.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify metal deck is clean and smooth, supported, secure, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system. Verify that flatness and fastening of metal roof decks comply with installation tolerances specified in Division 5 section "Steel Decking".
4. Verify deck surfaces are dry and free of snow or ice.
5. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips, nailing strips, and reglets are in place.
6. Verify that nailers and blocking match thickness of the roof insulation.

3.02 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flash and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 FULLY ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
   1. Install sheet according to ASTM D 5036.

B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesives: Roofing Installer and Roofing Membrane Manufacturer to determine appropriate adhesive material to be used on project based on; project type, substrate type, time of year of installation, average daily temperatures forcasted during installation, and other factors, as determined by the roof membrane manufacturer to maintain the specified warranty. No additional compensation will be considered, or due, the roofing contractor if the roof membrane manufacturer requires the type of bonding adhesive, originally bid, to be changed due to project type, environmental and/or temperature factors, to maintain the specified warranty. Either adhesive listed below is acceptable for use:
   1. Solvent-Based Bonding Adhesive: Apply solvent-based bonding adhesive to substrate and/or roof membrane at rate required by the roof membrane manufacturer. Apply and allow first coat of solvent based bonding adhesive to dry. Apply second coat of solvent based adhesive and install roof membrane. Solvent-based bonding adhesive applied in a bead or ribbon pattern to the substrate and/or membrane will not be accepted. Do not apply bonding adhesive to splice area of roofing membrane to be heat welded.
   2. Water-Based Bonding Adhesive: Apply water-based bonding adhesive to substrate at rate required by the roof membrane manufacturer. Apply single coat, or as required by roof membrane manufacturer, of water-based bonding adhesive and install roof membrane. Water-based bonding adhesive applied in a bead or ribbon pattern to the substrate and/or membrane will not be accepted. Do not apply bonding adhesive to splice area of roofing membrane to be heat welded.

D. RossTarrant Architects will not accept any membrane or field flashing adhesives other than the solvent-based or water-based adhesives described in this specification. Single or multi-component low-rise foams, urethanes, or any other type of single or multi-component adhesives will not be substituted or accepted.

3.04 BASE FLASHING INSTALLATION

A. Install sheet flashing and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply solvent-based bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with sheet flashing.

D. Clean seam areas and overlap and firmly roll sheet flashing into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashes and mechanically anchor to substrate through termination bars.

3.05 METAL DECK PREPARATION

A. Install deck sheathing on metal deck:
   1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
   2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.

3.06 INSULATION INSTALLATION

A. Roof Insulation - Metal Deck
   1. Mechanically fasten first layer of insulation to deck in accordance with roofing manufacturer's instructions and ASCE .
   2. Adhere subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer in accordance with roofing manufacturer's instructions and ASCE requirements.
   3. Adhere cover board with joints staggered minimum 6 inch from joints of preceding layer in accordance with roofing manufacturer's instructions and ASCE requirements.
   4. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
   5. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
   6. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
   7. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
   8. Do not apply more insulation than can be covered with membrane in same day.

B. Roof Drain Sump Insulation:
   1. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 24 inches.
   2. Roof Drains: Prior to the permanent roof membrane being installed, Contractor to provide a temporary, watertight material over the entire roof drain sump to allow moisture to drain into the roof drain piping. This temporary, watertight material is to be installed to prevent moisture from penetrating below the concrete deck, at all roof drain sumps.

3.07 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
   1. Notify Architect or Owner seven days in advance of date and time of inspection.

B. Final Roof Inspection Report: After final roof inspection is completed one copy of the final report (hardcopy or digital format) shall be provided to the General Contractor/Construction Manager, Architect, and Roofing Installer.

C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.08 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075400

SECTION 075400.01
THERMOPLASTIC MEMBRANE ROOFING SYSTEM MANUFACTURER'S CERTIFICATION

PART 1 GENERAL

1.01 THERMOPLASTIC MEMBRANE ROOFING SYSTEM MANUFACTURER'S CERTIFICATION

This certification must be completed and submitted as outlined in the Supplemental Instructions to Bidders. Failure to submit this completed certification may be cause for rejection of the bidder's proposal.

A. This certification must be completed and submitted within 24 hours after bids are received.

Date Submitted:_____

Name & Address of Roofing Systems Manufacturer:

_____

_____

_____

Name & Address of Roofing Systems Installer:

_____

_____

_____

I certify that _____ (Name of Roofing Installer) is an approved applicator of our roofing systems, and upon completion of this project, providing all terms and conditions for the manufacturer's guarantee are met, we will provide a no-dollar-limit 20-year manufacturer's guarantee for the roof.

Signed:_____Title: _____

(Roofing Systems Manufacturer)

END OF SECTION 075400.01

SECTION 077100
MANUFACTURED ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured roof specialties, including: reglet, counterflashing, expansion joint, and fascia

1.02 RELATED REQUIREMENTS

A. Section 074213 - Metal Wall Panels.

B. Section 075400 - Thermoplastic Membrane Roofing.

C. Section 077200 - Roof Accessories: Manufactured guards.

D. Section 079005 - Joint Sealers.

1.03 REFERENCE STANDARDS

A. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.

C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2012).

D. NRCA (RM) - The NRCA Roofing Manual; 2017.

E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

A. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

B. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.

C. Selection Samples: For each item with a paint finish specified, submit color chips representing manufacturer's full range of available colors. Submit actual samples not photo reproductions.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) details.

1.06 WARRANTY

A. Refer to roofing membrane section 075200 for Special Project Full System Warranty requirements for items to be included from this specification section.

B. Finish Warranty: Manufacturer's 20-year finish warranty stating products to be free of corrosion, checking, crazing, chalking, discoloring, fading, oxidation, and that exposed finish surface will not peel, crack, chip, or spall.
   1. Excessive color change/fading greater than 5 NBS (Hunter) units and passing 5000 hrs per ASTM D 2249-85, ASTM D 2244 and ASTM D 822-85 respectively.
   2. Chalking shall not be less than a rating of No. 8 per ASTM D 659 and ASTM D 4214.
   3. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

1.07 EXISTING WARRANTY

A. Contact existing roof manufacturer (Fibertite)_____ to insure that new work maintains existing roof warranty for any work done on existing roof.

B. Provide letter from existing roof manufacturer indicating that new work is included under existing roof warranty.

C. Provide manufacturers standard warranty for other products not associated with existing roof warranty.

PART 2 PRODUCTS

2.01 COMPONENTS

A. Fascia

1. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   a. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements, and aesthetics of the following:
      1) Metal-Era; Anchor-Tite: www.metalera.com
   b. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect.
      1) Architectural Products Co.: www.archprod.com.
      2) Dimensional Metal Inc. (DMI): www.dmimetals.com
      3) Drexel Metal, Inc./A Carlisle Company: www.drexmet.com
      4) Holcim/Elevate (formerly Firestone Building Products, Inc.): www.firestonebpco.com
      5) OMG Roofing Products/OMG Edge Systems formerly W. P. Hickman: www.omgroofing.com
      6) Metal-Era Inc: www.metalera.com.
      7) Johns Manville: www.jm.com
      8) Metal Roofing Systems: www.metalroofingsystems.com
      9) MM Systems Corp: www.mmsystemscorp.com
      10) Sika Saranfil: www.sarnafilus.com
      11) Siplast: www.siplast.com
      12) Soprema: www.soprema.us
2. Provide fascia in shapes and sizes indicated, with shop-mitered and welded-corners. Include water dams formed from at least 0.028-inch- (0.7-mm-) thick, galvanized steel sheet; anchor plates; cleats or other attachment devices; concealed splice plates; and trim and other accessories indicated or required for complete installation, with no exposed fasteners.
3. High performance roof edge system shall be certified by the manufacturer to comply with ANSI/SPRI Standard ES-1-98. Roof edge shall meet performance design criteria according to the following test standards:
   a. ANSI/SPRI ES-1-98 Test Method RE-1 Test for Roof Edge Termination of Single-Ply Roofing Membranes: The fascia system shall be tested to secure the membrane to minimum of 100 lbs/ft in accord with the ANSI/SPRI ES-1-98 Test Method RE-1. Use the current edition of ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
   b. ANSI/SPRI ES-1-98 Test Method RE-2 Pull-Off Test for Fascia: The fascia system shall be tested in accord with the ANSI/SPRI ES-1-98Test Method RE-2. Use the current edition of ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
4. The fascia product shall be approved for use in Miami-Dade County and has been designed to comply with Florida Building Code, including the High Velocity Hurricane Zone, Miami-Dade County NOA No. 03-0108.06 Expiration Date 12/11/08.
5. Performance Characteristics:

a. Extruded bar shall lock membrane, prevent wind pullback.
b. Injection molded EPDM splices to allow thermal expansion of extruded aluminum anchor bar.
c. Fascia shall freely thermal cycle on extruded bar, preventing periodic maintenance.

6. Fascia metal gauge: Contractor's option of .040" thick formed aluminum or 24 ga. galvanized steel.
7. Extruded bar: Shall be continuous 6063-T6 alloy aluminum at 12'-0" (3.65 m) standard lengths. All bar miters are welded.
8. Fasteners: #9 x 2" stainless steel fasteners provided with drivers. No exposed fasteners permitted.
9. All inside and outside corners to be manufactured corner pieces to eliminate seams.
10. Standard Face Height: Minimum 6 1/2", or manufacturers next larger size, unless noted otherwise on the drawings.

B. Reglets and Counterflashing:
1. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
a. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements, and aesthetics of the following:
1) Fry Reglet: MA Masonry Reglet - Customized with flat flange
(a) MA-3 (3 inch customized horizontal flat flange for brick)
2) Fry Reglet: 90-Degree Inside and Outside Reglet Corners
3) Fry Reglet: Spring Lock Flashing.
4) Fry Reglet: Inside and Outside Spring Lock Flashing Corners.
5) Fry Reglet: Spring Lock Flashing End Cap
b. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect.
1) Fry Reglet: www.fryreglet.com
2) OMG Roofing Products/OMG Edge Systems formerly W. P. Hickman: www.omgroofing.com
3) Metal-Era Inc: www.metalera.com.
2. General: Provide two-piece reglets with counterflashing receiver of type, material, and profile indicated, compatible with counterflashing. Form to securely interlock with counterflashing.
3. Reglet - Masonry Type - MA: Provide with top flange for embedment in masonry mortar joint. Embedment flange into masonry to be flat and not have a turned up leg that creates a water dam for the flexible flashing.
a. Material: 24 gauge galvanized steel.
b. Provided by Roofing Contractor and installed by Masonry Contractor.
4. Counterflashing
a. Provide springlock counterflashing fabricated from the same metal as reglets and compatible with reglet system installed.
1) Material: 24 gauge galvanized steel.
2) Color to match reglet.
3) Provided and installed by roofing contractor.
5. 90-Degree Inside and Outside Reglet and Spring Lock Flashing Corners
a. Material: 24 gauge galvanized steel
b. Color to match reglet and counterflashing.
c. Reglet: Provided by Roofing Contractor and installed by Masonry Contractor/Wall Panel Contractor.
d. Counterflashing: Provided and installed by roofing contractor.
e. Acute and Obtuse Intersections: Contractor to field verify and special order for corner angles less or more than 90-Degree.
6. Spring Lock Flashing System End Cap

a. Factory provided 1 inch wide foam insert to close open end of the counterflashing. Insert to function as a backer for exterior sealant.
1) Sealant color to match counterflashing.

2.02 ACCESSORIES

A. Sealant: Type specified in Section 079005.

B. Roof Cement: ASTM D4586/D4586M, Type I.

C. General: Provide manufacturer's standard accessories designed and manufactured to match and fit roof edge treatment system indicated.

D. Exposed Fasteners: Stainless steel, nonmagnetic, of manufacturer's standard type and size for product and application indicated. Match finish of exposed heads with material being fastened.

E. Concealed Fasteners: Same metal as item fastened or other noncorrosive metal as recommended by manufacturer.

F. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

G. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coat.

H. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

I. Foam-Rubber Seal: Manufacturer's standard foam.

J. Adhesives: Type recommended by manufacturer for substrate and project conditions, and formulated to withstand minimum 60-lbf/sq. ft. (2.9-kPa) wind-uplift force.

2.03 FABRICATION

A. Roofing Contractor/Local Fabricator shop or field fabricated/broken fascia, reglet, counterflashing, and expansion joint will not be accepted.

B. All roof edge components are to be designed and tested to meet ANSI/SPRI ES-1, and be fabricated in an ANSI/SPRI ES-1 approved fabrication facility.

C. All roof edge components are to be designed and tested to meet FM requirements, and be fabricated to FM approved designs.

2.04 FINISHES

A. All exposed to view roof components specified above to have the following finish.
1. All items to be the same color unless specifically noted.

B. Finishes: Due to differences in manufacturer finishing standards, or base metal used, provisions for clear and/or color anodized, and painted material is included. All finishes are acceptable and manufacturers are to provide their standard of ONE listed below.
1. High-Performance Organic Finish (2-coat Fluoropolymer): AA-C12C40R1X (Chemical Finish): cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer’s standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers’ written instructions.
a. Color to be selected from manufacturers standard color chart. Minimum twenty colors.
b. The following components to be painted; fascia, reglet, counterflashing, and expansion joint cover.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION

A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Comply with NRCA (RM) drawing details as noted:

C. Coordinate installation of components of this section with installation of roofing membrane and base flashings.

D. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

E. Coordinate installation of flashing flanges into reglets.

END OF SECTION 077100

SECTION 077200
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof hatch guardrail and gate system.

B. Roof edge protection.

1.02 RELATED REQUIREMENTS

A. Section 075400 - Thermoplastic Membrane Roofing.

B. Section 077100 - Manufactured Roof Specialties: Other manufactured roof items.

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; 2015.

B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).

C. FM (AG) - FM Approval Guide; Factory Mutual Research Corporation; current edition.

D. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.04 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Maintenance requirements.

B. Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.

C. Warranty Documentation:
   1. Submit manufacturer warranty.
   2. Ensure that forms have been completed in Owner's name and registered with manufacturer.
   3. Submit documentation that roof accessories are acceptable to roofing manufacturer, and do not limit the roofing warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

1.06 PRODUCT WARRANTY

A. Correct defective Work within a five year period after Date of Substantial Completion.

B. Provide five year manufacturer warranty for hatches and accessories.

1.07 ROOF SYSTEM WARRANTY

A. Refer to roofing membrane section 075200 for Special Project Full System Warranty requirements for items to be included from this specification section.

PART 2 PRODUCTS

2.01 ROOF HATCH SAFETY RAIL AND SAFETY POST

A. Contractor's option to provide a combination roof hatch, integral roof hatch safety rail and safety post system, or separate roof hatch, freestanding roof hatch safety rail and safety post system.
   1. Manufacturers - Freestanding Roof Hatch Safety Rail: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
      a. Basis of Design: Design concept and the drawings indicate the size, profiled, dimensional requirements and aesthetics of the following:
         1) Bluewater Manufacturing; Non-Penetrating Roof Hatch Railing SR2K.
      b. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect.
         1) Bluewater Manufacturing: www.bluewater-mfg.com
         2) Garlock Safety Systems: www.railguard.net
         3) Kee Guard Railing: www.keesafetygroup.com
      c. Freestanding Roof Hatch Safety Railing: Non-penetrating railing system with top rail, mid rail, and OSHA complaint swinging gate, with the hatch curb acting as the toe plate. System shall be capable of being dismantled for roof repair.
         1) System to support 200 lb., minimum in any direction for all components in accordance with OSHA Regulation 29 CFR 1910.23.
         2) Height: 42 inches, minimum.
         3) Width: Fit roof hatch. Refer to roof hatch information for hatch size.
         4) Railings: 1-5/8 inch O.D. hot rolled pickled electric weld tube, free of sharp edges and snag points.
         5) Mounting Bases: Class 30 gray iron material cast with four receiver posts. Provide rubber pads on bottom of bases.
         6) Posts: Shall have positive locking system into slots that allow rails to be mounted in any direction. Friction locking systems are not allowed. Receiver posts shall have drain holes.
         7) Railing Hardware: Securing pins shall be 101 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and lanyard that connects to a lynch pin.
         8) Gate Hardware: Bolts and washers shall be 3/8 inch by 3-1/2", zinc plated.
         9) Gate Opener: Latch pole.

2.02 ROOF EDGE PROTECTION

A. Manufacturers - Roof Edge Protection: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   1. Basis of Design: Contractor option to furnish a steel or aluminum system. Design concept and the drawings indicate the size, profiled, dimensional requirements and aesthetics of the following:
      a. Bluewater Manufacturing; Non-Penetrating Roof Edge Protection Architectural Series; SafetyRail 2000.
   2. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions, profiles, and formulations are minor and do not change the design concept as judged by the Architect.
      a. Bluewater Manufacturing - Non-Penetrating Roof Edge Protection SafetyRail 2000: www.bluewater-mfg.com
      b. Garlock Safety Systems - RailGuard 200: www.railguard.net
      c. FixFast USA - Non-Penetrating Roof Edge Protection KATTSAFE GW34: www.fixfastusa.com
      d. Rooftop Anchor, Inc.: www.rooftopanchor.com

B. Roof Edge Protection: Non-penetrating railing system with top rail, mid rail, and non-penetrating base plates. System shall be capable of being dismantled for roof repair.
   1. System to support 200 lb., minimum in any direction for all components in accordance with OSHA Regulation 29 CFR 1910.23.
   2. Height: 42 inches, minimum.
   3. Length: Contractor to coordinate the final length of the railing system with the Mechanical/Electrical/Plumbing Subcontractor and the mechanical/electrical/plumbing equipment being supplied and installed on the roof. The railing shall extend not less than 30 inches beyond each end of the unit being installed.
   4. Steel Railings: 1-5/8 inch O.D. hot rolled pickled electric weld tube, free of sharp edges and snag points.
   5. Aluminum Railings: 1-5/8 inch O.D. extruded electric weld tube, free of sharp edges and snag points.
   6. Mounting Bases: Class 30 galvanized, gray iron material cast with four receiver posts. Provide rubber pads on bottom of bases.
   7. Posts: Shall have positive locking system into slots that allow rails to be mounted in any direction. Friction locking systems are not allowed. Receiver posts shall have drain holes.
   8. Railing Hardware: Securing pins shall be 101 carbon steel, zinc plated and yellow chromate dipped. Pins shall consist of collared pin and lanyard that connects to a lynch pin.
   9. Steel Finish: Factory finish powder-coat paint. Color selected by Architect from manufacturers standard color chart.
   10. Aluminum Finish: Galvanized.

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. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING

A. Clean installed work to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 077200

SECTION 078400
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Firestopping systems.

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

C. Marking and identification of rated walls.

1.02 RELATED REQUIREMENTS

A. Section 092116 - Gypsum Board Assemblies: Gypsum wallboard acoustic insulation.

1.03 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; current edition.

B. FM 4991 - Approval Standard for Firestop Contractors; 2013.

C. FM (AG) - FM Approval Guide; current edition.

D. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

E. UL (FRD) - Fire Resistance Directory; current edition.

1.04 SUBMITTALS

A. Product Data: Provide data on product characteristics, performance ratings, and limitations.

B. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Installer Qualification: Submit qualification statements for installing mechanics.

1.05 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.

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

C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Approved by Factory Mutual Research Corporation under FM 4991.
   2. OR meeting the following requirements:
      a. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified tested and listed system requirements.
      b. Installation personnel shall be trained by the approved firestop manufacturer.
      c. Installation personnel to have minimum 3 years documented experience installing work of this type.
      d. Verification of at least five satisfactorily completed projects of comparable size and type.
      e. Approved by firestopping manufacturer.

3. If the CM/GC allows firestopping to be installed by individual contractors then every contractor installing firestopping is to have a certified firestopping mechanic and provide shop drawings and a warranty. Every installing contractor is to submit a certification form.

D. Installing Mechanic's Qualifications: Trained by firestopping manufacturer and able to provide evidence thereof.

E. Source Limitations: Obtain each type of sprayed fire-resistive material from one source by a single manufacturer.

1.06 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.

1.07 WARRANTY

A. Correct defective Work within a one year period after Date of Substantial Completion.
1. Include coverage for firestopping to remain free from cracking, separation, and blistering.
2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.01 MATERIALS

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

2.02 FIRESTOPPING SYSTEMS

A. Firestopping at Uninsulated Metallic Pipe and Conduit Penetrations, of diameter 4 inches or less: Any material meeting requirements.

B. Firestopping at Combustible Pipe and Conduit Penetrations, of diameter 4 inches or less: Any material meeting requirements.

C. Firestopping at Cable Tray Penetrations: Any material meeting requirements.

D. Firestopping at Cable Penetrations, not in Conduit or Cable Tray: Caulk or putty.

E. Firestopping at Control Joints (without Penetrations): Any material meeting requirements.

2.03 MATERIALS

A. Manufacturers: Subject to compliance with requirements the following products may be included in the work;
1. A/D Fire Protection Systems Inc: www.adfire.com.
2. 3M Fire Protection Products: www.3m.com/firestop.
3. Hilti, Inc: www.us.hilti.com.
4. Specified Technologies, Inc: www.stifirestop.com
5. RPM Company - TREM Fire Protection Systems Group: www.tremcofirestop.com
6. Rectorseal - Metacaulk: www.rectorseal.com

B. Fire Safing: ASTM C 665; preformed glass fiber, friction fit type, unfaced. Thickness: 3 inch. or as required to meet UL system detailed on drawings.
1. Owens Corning - Thermafiber SAFB: www.usg.com
2. Roxul Inc. - Roxul AFB: www.roxul.com

C. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than 250 g/L.

D. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.

E. Foam Firestoppping: Single component silicone foam compound; conforming to the following:

F. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers; conforming to the following:

G. Fiber Firestopping: Mineral fiber insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening; conforming to the following:

H. Firestop Devices - Wrap Type: Mechanical device with incombustible filler and sheet stainless steel jacket, intended to be installed after penetrating item has been installed; conforming to the following:

I. Firestop Devices - Cast-In Type: Sleeve and sealing material, intended to be cast in concrete floor forms or in concrete on metal deck, not requiring any additional materials to achieve penetration seal.

J. Intumescent Putty: Compound that expands on exposure to surface heat gain; conforming to the following:

K. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

2.04 MARKING AND IDENTIFICATION

A. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be permanently identified with signs or stencils.

B. Locate identification in accessible floor, ceiling or attic spaces.

C. Locate identification within 15 feet of the end of each wall and at intervals not exceeding 30 feet.

D. Sign lettering to be not less than 3 inches in height with a minimum 3/8 inch stroke in a contrasting color Incorporating the wall name/rating wording.

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.

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 marking and identification required by code.

3.04 FIELD QUALITY CONTROL

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

3.05 PROTECTION

A. Clean adjacent surfaces of firestopping materials.

B. Protect adjacent surfaces from damage by material installation.

END OF SECTION 078400

SECTION 079005
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sealants and joint backing.

B. Precompressed foam sealers.

1.02 RELATED REQUIREMENTS

A. Section 078400 - Firestopping: Firestopping sealants.

B. Section 088000 - Glazing: Glazing sealants and accessories.

C. Section 093000 - Tiling: Sealant used as tile grout.

D. Section 321373 - Pavement Joint Sealants: Exterior sealants for horizontal pavements and surfaces.

1.03 REFERENCE STANDARDS

A. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).

B. ASTM C834 - Standard Specification for Latex Sealants; 2014.

C. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

F. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.04 SUBMITTALS

A. Product Data: Provide data indicating sealant chemical characteristics.

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 three years documented experience.

C. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

1.06 PROJECT CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.07 SEQUENCING AND SCHEDULING

A. Coordinate the work with all sections referencing this section.

1.08 WARRANTY

A. Correct defective work within a five year period after Date of Substantial Completion.

B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   1. Silicone, Polyurethane and Acrylic Sealants:
      a. Dow Corning: www.dowcorning.com
      b. Bostik Inc: www.bostik-us.com.
      c. Henkel Corp./GE Silicones: www.gesealants.com.
      d. Pecora Corporation: www.pecora.com.
      e. BASF Construction Chemicals-Building Systems: www.chemrex.com.
      f. Tremco Global Sealants; Product : www.tremcosealants.com.
      g. Sika Construction: www.sikaconstruction.com
      h. Soudal Inc.: www.soudalusa.com

B. Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include:
   1. Preformed Compressible Foam Sealers:
      a. EMSEAL Joint Systems, Ltd: www.emseal.com.
      b. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
      c. Dayton Superior Corporation: www.daytonsuperior.com.
      d. Tremco Global Sealants: www.tremcosealants.com.
      e. Sika Construction: www.sikaconstruction.com
      f. Soudal Inc.: www.soudalusa.com

2.02 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than 250 g/L where applied within the waterproofing envelope.

B. General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
   1. Color: Standard colors matching finished surfaces.
   2. Applications: Use for:
      a. Control, expansion, and soft joints in masonry.
      b. Joints between concrete and other materials.
      c. Joints between metal frames and other materials.
      d. Other exterior joints for which no other sealant is indicated.

C. Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
   1. Face color: Match exterior masonry veneer.
   2. Size as required to provide weathertight seal when installed.
   3. Provide product recommended by manufacturer for traffic-bearing use.
   4. Applications: Use for:
      a. Exterior wall expansion joints.

D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
   1. Color: Standard colors matching finished surfaces.
   2. Applications: Use for:
      a. Interior wall and ceiling control joints.
      b. Joints between door and window frames and wall and floor surfaces.
         1) Color at intersection of door frame bottom and resilient, sealed or coated flooring to match door frame color.
      c. Other interior joints for which no other type of sealant is indicated.

E. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses I, M and A; single component, mildew resistant.
   1. Applications: Use for:
      a. Joints between plumbing fixtures and floor and wall surfaces.
      b. Joints between kitchen and bath countertops and wall surfaces.

F. Acoustic Sealant/Sound Caulk: Permanently tacky non-hardening acrylic sealant.
   1. Minimum 1/4 inch, continuous, sealant bead, both sides, of top stud runner and structure and bottom stud track and floor.
   2. Minimum 1/4 inch, continuous, sealant bead, around all openings, penetrations, and partition intersections.

G. Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C920, Grade P, Class 25, Uses T, M and A; single component.
   1. Approved by manufacturer for wide joints up to 1-1/2 inches.
   2. Color: Standard colors matching finished surfaces.
   3. Applications: Use for:
      a. Expansion joints in floors.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
   2. Type for Joints Subject to Pedestrian Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
   3. Open Cell: 40 to 50 percent larger in diameter than joint width.
   4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
   5. Manufacturers:
      a. ADFAST Corporation: www.adfastcorp.com#sle.
      b. Nomaco, Inc: www.nomaco.com/#sle.
      c.

D. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

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

B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

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

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

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

D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

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

B. Perform installation in accordance with ASTM C1193.

C. Perform acoustical sealant application work in accordance with ASTM C919.
   1. Minimum 1/4 inch, continuous, sealant bead, both sides, of top stud runner and structure and bottom stud track and floor.
   2. Minimum 1/4 inch, continuous, sealant bead, around all openings, penetrations, and parition intersections.

D. 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.

E. Install bond breaker where joint backing is not used.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

H. Tool joints concave.

I. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

J. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect sealants until cured.

END OF SECTION 079005

SECTION 079513
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Expansion joint assemblies for floor and wall surfaces.

1.02 RELATED REQUIREMENTS

A. Section 033000 - Cast-in-Place Concrete: Expansion and contraction joints in junction of concrete slab-on-grade.

B. Section 079005 - Joint Sealers: Expansion and control joint finishing utilizing a sealant and bond breaker.

C. Section 092116 - Gypsum Board Assemblies: Placement of expansion joint assemblies in gypsum board walls and ceilings.

1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.

C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2010.

D. ASTM B455 - Standard Specification for Copper-Zinc-Lead Alloy (Leaded-Brass) Extruded Shapes; 2010.

1.04 SUBMITTALS

A. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.

B. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.

1.05 QUALITY ASSURANCE

A. Field Measurements: Verify compliance with manufacturer's requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Expansion Joint Cover Assemblies: Subject to compliance with requirements provide products by one of the following, but not limited to the following:
   1. Pittcon/Nystrom/Architectural Art Mfg., Inc: www.archart.com.
   2. Balco, Inc.: www.balcousa.com
   3. C/S Group; C/S Construction Specialties, Inc: www.c-sgroup.com.
   4. Erie Metal Specialties (EMS), Inc.: www.eiremetal.com
   5. Inpro: www.inprocorp.com.
   6. MM Systems Corp: www.mmsystemscorp.com/#sle.
   7. Nystrom, Inc: www.nystrom.com/#sle.
   8. BASF/Watson Bowman Acme Corp.: www.wbacorp.com

B. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:

1. Pittcon/Nystrom/Architectural Art Manufacturing Model EJN-DT-100 (formerly AAM #K-10-11-11) for interior floor to floor.
2. InPro Corporation Model: 1200 Series Foam Seal for exterior vertical expansion joint in masonry veneer.

2.02 EXPANSION JOINT COVER ASSEMBLIES

A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
   1. Joint Dimensions and Configurations: As indicated on drawings.
   2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
   3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
   4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

B. Exterior Vertical Expansion Joint:
   1. Flexible profile manufactured from a monolithic piece of foam and factory applied elastomeric silicone or urethane membrane coating to provide moisture and water intrusion on vertical surfaces. Profile shall be capable of providing plus or minus 25% building movement and resist ultraviolet degradation. Profile shall be installed without the use of adhesives or anchor system.
      a. Seal preformed and manufacturer from a polyether urethane foam per ASTM C864-98 with a factory applied silicone or urethane membrane on the exposed face.
      b. Color to be selected by Architect from manufacturers standard color range.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.

B. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

2.04 FABRICATION

A. Joint Covers: Aluminum cover plate, aluminum frame construction, designed to permit cover movement with full recovery, flush mounted.

B. Provide joint components in single length wherever practical. Minimize site splicing.

2.05 FINISHES

A. Floors: Mill finish.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.02 PREPARATION

A. Install anchoring devices in conformance to templates.

3.03 INSTALLATION

A. Install components and accessories in accordance with manufacturer's instructions.

B. Align work plumb and level, flush with adjacent surfaces.

C. Rigidly anchor to substrate to prevent misalignment.

3.04 PROTECTION

A. Do not permit traffic over unprotected floor joint surfaces.

B. Provide strippable coating to protect finish surface.

END OF SECTION 079513

SECTION 081113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Hollow metal frames for wood doors.

C. Fire-rated steel frames and doors.

D. Thermally insulated hollow metal doors with frames.

E. Hollow metal borrowed lites glazing frames.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Shims.

B. Section 099000 - Painting: Field painting.

1.03 REFERENCE STANDARDS

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.

B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames; 2007 (R2011).

C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

F. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames; 2012.

G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.

I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.

J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

K. ASTM A924 - Specification for General Requirements for Steel Sheet, Metallic Coated by the Hot Dip Process.

L. ASTM A 1008/A 1008M - Standard Specification for Steel, sheet, Cold rolled, Carbon, High Strength Low-Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened and Bake Hardenable.

M. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.

N. ASTM E413 - Classification for Rating Sound Insulation; 2010.

O. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.

P. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000 (ANSI/DHI A115 Series).

Q. ITS (DIR) - Directory of Listed Products; current edition.

R. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

S. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

T. NAAMM HMMA 820 TN01 - Grouting Hollow Metal Frames

U. NAAMM HMMA 820 TN03 - Guidelines for Glazing of Hollow Metal Transom, Sidelight and Windows.

V. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

W. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.

X. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

Y. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2016.

Z. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.

AA. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.

AB. SDI 111 - Recommended Details and Guidelines for Standard Steel Doors and Frames and Accessories.

AC. UL (BMD) - Building Materials Directory; current edition.

AD. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

AE. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

AF. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.

B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
   1. Provide hollow metal frames from SDI Certified manufacturer.

B. Maintain at project site copies of reference standards relating to installation of products specified.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Doors and Frames: Subject to compliance with requirements, manufacturers offering the following products that may be incorporated into the work include;
   1. Basis of Design: Design concept and the drawings indicate the size, profiles, dimensional requirements and aesthetics of the following:
      a. Steelcraft B-Series full flush, steel stiffened doors.
   2. Products by other manufacturers (listed below) may be considered, provided deviations in dimensions and profiles are minor and do not change the design concept as judged by the Architect:
      a. Curries, an Assa Abloy Group company: www.assaabloydss.com.
      b. Custom Metal Products: www.custommetalproductsnc.com
      c. De La Fontaine Industries: www.delafontaine.com
      d. Mesker, dormakaba Group: www.meskeropeningsgroup.com/#sle.
      e. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
      f. Ceco Door Products an Assa Abloy Group company: www.cecodoor.com.
      g. Steelcraft, an Allegion brand: www.allegion.com/#sle.
      h. Metal Products Inc. (MPI): www.metalproductsinc.com
      i. Pioneer Industries : www.pioneerindustries.com

2.02 DESIGN CRITERIA

A. Requirements for Hollow Metal Doors and Frames:
   1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.
   3. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Exterior Doors: Thermally insulated.
   1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 1, full flush.
      a. Level 3 - Extra Heavy-duty.
      b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 16 gauge, 0.053 inch, minimum.
      e. Door Face Texture: Smooth.
      f. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
      g. Primer: Factory applied baked-on rust inhibiting primer paint in accordance with ANSI A250.10-2011.

2. Core: Vertical steel stiffeners, 20 gage, spaced not to exceed six inches apart, welded to face sheet and bonded to opposite face. Fill between stiffeners with manufacturers standard extruded polystyrene insulation or batt insulation.
   a. Insulating Value: U-value of 0.61, when tested in accordance with ASTM C1363.
      1) If polystyrene provided - Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
3. Door Thickness: 1-3/4 inch, nominal.
4. Top and Bottom Closures : Close top and bottom edges of doors flush as an integral part of the door construction or by the addition of 14 gage, metallic-coated steel channels with channel webs placed even with top and bottom edges.
   a. Provide top cap to protect against weather.
   b. Bottom closure is not required on doors with concealed automatic door bottoms. Provide manufacturers standard door bottom.
5. Door Edges: Full height, standard visible edge seam.
6. Door Edge Profile: Beveled, both sides, hinge and lock edges.
7. Door Undercut: Manufacturer's standard, compatible with threshold configuration specified in section 087100.
8. Hinge and Hardware Prep: Manufacturers standard reinforcing per ANSI A250.8-2017. Provide concealed reinforcement for closers and mortise locks.
9. Weatherstripping: Refer to Section 087100.
10. Glass Light Stops/Trim: Flush mounted 18 gage steel trim for 7/8 inch to 1 inch insulated glass units. Mitered or butted corners; prepared for countersink style tamper proof screws on secure side of the door.
    a. Provide reinforced channel for full glass doors.

B. Interior Doors, Non-Fire Rated:
1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 1, full flush.
   a. Level 2 - Heavy-duty.
   b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
   c. Model 1 - Full Flush.
   d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
   e. Door Face Texture: Smooth.
   f. Primer: Factory applied baked-on rust inhibiting primer paint in accordance with ANSI A250.10-2011.
2. Core: Vertical steel stiffeners, 20 gage, spaced not to exceed six inches apart, filled with fiberglass batt or mineral wool insulation
3. Door Thickness: 1-3/4 inch, nominal.
4. Top and Bottom Closures : Close top and bottom edges of doors flush as an integral part of the door construction or by the addition of 14 gage, metallic-coated steel channels with channel webs placed even with top and bottom edges.
   a. Bottom closure is not required on doors with concealed automatic door bottoms. Provide manufacturers standard door bottom.
5. Door Edges: Full height, standard visible edge seam.
6. Door Edge Profile: Beveled, both sides, hinge and lock edges.
7. Door Undercut: Manufacturer's standard, compatible with threshold configuration specified in section 087100.
8. Hinge and Hardware Prep: Manufacturers standard reinforcing per ANSI A250.8-2017. Provide concealed reinforcement for closers and mortise locks.
9. Glass Light Stops/Trim: Flush mounted 18 gage steel trim for 1/4 inch glass. Mitered or butted corners; prepared for countersink style tamper proof screws on secure side of the door.
   a. Provide reinforced channel for full glass doors.

C. Fire-Rated Doors:

1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 1, full flush.
   a. Level 2 - Heavy-duty.
   b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
   c. Model 1 - Full Flush.
   d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
   e. Door Face Texture: Smooth.
   f. Primer: Factory applied baked-on rust inhibiting primer paint in accordance with ANSI A250.10-2011.
2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
   a. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
   b. Provide units listed and labeled by UL (DIR) or ITS (DIR).
   c. Attach fire rating label to each fire rated unit.
   d. Smoke and Draft Control Doors (Indicated with letter "S" on Drawings and/or Door Schedule): Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following;
      1) Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
      2) Gasketing: Refer to Section 087100.
      3) Label: Include the "S" label on fire-rating label of door.
3. Door Core Material: Manufacturers standard core material/construction in compliance with requirements. Vertical steel stiffeners, 20 gage, spaced not to exceed six inches apart.
4. Door Thickness: 1-3/4 inch, nominal.
5. Top and Bottom Closures : Close top and bottom edges of doors flush as an integral part of the door construction or by the addition of 14 gage, metallic-coated steel channels with channel webs placed even with top and bottom edges.
   a. Bottom closure is not required on doors with concealed automatic door bottoms. Provide manufacturers standard door bottom.
6. Door Edges: Full height, standard visible edge seam.
7. Door Edge Profile: Beveled, both sides, hinge and lock edges.
8. Door Undercut: Manufacturer's standard, compatible with threshold configuration specified in section 087100.
9. Hinge and Hardware Prep: Manufacturers standard reinforcing per ANSI A250.8-2017. Provide concealed reinforcement for closers and mortise locks.
10. Glass Light Stops/Trim: Flush mounted minimum 18 gage steel trim for 1/4 inch glass. Mitered or butted corners; prepared for countersink style tamper proof screws on secure side of the door.
    a. Provide reinforced channel for fire rated doors.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. General:
   1. Comply with the requirements of grade specified for corresponding door.
      a. Frames for Exterior Hollow Metal Doors: Comply with frame requirements specified in ANSI A250.8 Level 3 Doors: 14 gage frames.
      b. Frames for Interior Wood and Hollow Metal Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage.
   2. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

3. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
4. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
5. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.
6. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
7. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

C. Exterior Door Frames: Face welded type for CMU/masonry wall types.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
2. Finish: Factory primed, for field finishing.
3. Wall Attachment: Lock-in masonry "T". Minimum three anchors per jamb.
4. Weatherstripping: Separate, see Section 087100.

D. Exterior Door Frames: Face welded type for metal stud walls with wood blocking and exterior veneer wall types.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
2. Finish: Factory primed, for field finishing.
3. Wall Attachment: Metal stud anchor/flush steel stud anchor. Minimum three anchors per jamb.
4. Floor Attachment: Fixed base.
5. Weatherstripping: Separate, see Section 087100.

E. Exterior Door Frames at existing CMU Walls: Fully welded type, seamless with joints filled.
1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
2. Finish: Factory primed, for field finishing.
3. Existing Wall Construction - Wall Attachment: Wall anchors. Minimum three anchors per jamb. Anchors to be 3/8" diameter, minimum.
4. Frame and Anchor Configuration Options:
    a. Flush Frames: Installer to "dimple" frame to recess head of anchor flush with surface of frame. Install a sandable, resin-based metal compatible filler at each anchor. Sand filler smooth after curing.
    b. EMA Frame: Frame to have a factory "dimple" to flush the head of the anchor to the stop. Install a sandable, resin-based metal compatible filler at each anchor. Sand filler smooth after curing.
    c. EMA Frame: Flush frame with pre-drilled anchor holes. Frames to come with hole plugs.

F. Interior Door Frames at new CMU Walls, Non-Fire-Rated and Fire-Rated: Fully welded type, seamless with joints filled.
1. Fire Rating: Same as door, labeled.
2. Finish: Factory primed, for field finishing.
3. New Wall Construction - Wall Attachment: Lock-in masonry "T". Minimum three anchors per jamb.

G. Interior Door Frames at existing CMU Walls, Non-Fire-Rated and Fire-Rated: Fully welded type, seamless with joints filled.
1. Fire Rating: Same as door, labeled.
2. Finish: Factory primed, for field finishing.
3. Existing Wall Construction - Wall Attachment: Wall anchors. Minimum three anchors per jamb. Anchors to be 3/8" diameter, minimum.

4. Frame and Anchor Configuration Options:
   a. Flush Frames: Installer to "dimple" frame to recess head of anchor flush with surface of frame. Install a sandable, resin-based metal compatible filler at each anchor. Sand filler smooth after curing.
   b. EMA Frame: Frame to have a factory "dimple" to flush the head of the anchor to the stop. Install a sandable, resin-based metal compatible filler at each anchor. Sand filler smooth after curing.
   c. EMA Frame: Flush frame with pre-drilled anchor holes. Frames to come with hole plugs.

H. Interior Door Frames at Gypsum Board/Metal Stud Partitions Non-Fire-Rated and Fire-Rated: Knock-down type, slip-on with mitered or coped corners for field assembly.
1. Fire Rating: Same as door, labeled.
2. Finish: Factory primed, for field finishing.
3. Wall Attachment: Metal stud anchor/flush steel stud anchor. Minimum three anchors per jamb.
4. Floor Attachment: Fixed base.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
1. Fire-Rated Frames: Comply with fire rating requirements indicated.
2. When temperature conditions necessitate the use of anti-freezing agents in the mortar and frame is grouted soid, the inside of the frame shall be coated per manufacturer recommendations.
3. Back coating to be installed at factory by frame manufacturer or field applied.

2.06 ACCESSORIES

A. Glazing: As specified in Section 088000.

B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.

C. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.

D. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

E. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Cold Weather Application: Frame installer to coat inside of frames that will be installed in masonry and filled with grout with anti-freeze additives prior to installation.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.

E. Install door hardware as specified in Section 087100.

F. Comply with glazing installation requirements of Section 088000.

G. Coordinate installation of electrical connections to electrical hardware items.

H. Touch up damaged factory finishes.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION 081113

SECTION 081416
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush and flush glazed configuration; non-rated.

B. Factory glazing of doors.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry: Installation of wood doors and hardware.

B. Section 081113 - Hollow Metal Doors and Frames.

C. Section 087100 - Door Hardware.

1.03 REFERENCE STANDARDS

A. ASTM E152 - Methods of Fire Tests of Door Assemblies.

B. ICC (IBC) - International Building Code; 2012.

C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services/Warnock Hersey NA, Inc.; current edition.

D. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.

E. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.

F. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

G. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

H. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

1.04 SUBMITTALS

A. Product Data: Indicate door core materials and construction; thickness, veneer species, type and characteristics, cut and matching requirements, factory machining and factory finishing criteria. Provide glass size, type, pattern and thickness for factory glazed doors..

B. Test Reports: Show compliance with specified requirements for the following:
   1. Indicate compliance with specified fire rating (positive pressure or neutral pressure).

C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing

D. Selection Samples: Submit samples representing manufacturer's full range of available colors. Submit actual samples not photo reproductions.

1.05 QUALITY ASSURANCE

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

1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard and manufacturer's care and handling instructions.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.