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PROJECT PARTICIPANTS

Project: **Bryant Community Center Addition**
3 West Eden Court
Ann Arbor, Michigan

Owner/Management: **Ann Arbor Parks & Rec and
Community Action Network**
Ann Arbor, Michigan
aKuras@a2Gov.org
734-794-6230

Architect:



**Mitchell
and Mouat
architects**
113 South Fourth Avenue Ann Arbor, Michigan 48104
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MaMA Job Number: **Job 1531**

Civil Engineer: **Zeimet-Wozniak**
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248-437-5099

Structural Engineer: **Dailey Engineering, Inc.**
8485 Stephenson Road
Onsted, MI 49265
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517-467-9000

Mechanical/Electrical Engineer: **MEEC, pc**
1415 Goldsmith
Plymouth, MI. 48170
jim@meeci.com
734-454-5516

SECTION 00105 – Supplement A – Request for Information Form

PART 1 - GENERAL

1.01 INTERPRETATION OF DOCUMENTS:

- A. Attached is the Request for Information form to be used by Bidding Contractors and Bidding Subcontractors during the bidding period of the project.
- B. Requests for Information will be answered by Addendum only, but some clarifications may be made to Bidding Contractors by phone, at the discretion of the Architect. Refer to Section 00100 Instructions to Bidders for further information.
- C. All sections of the Request for Information form must be filled out, in their entirety.
- D. Bidding Contractors may use their own in-house Request for Information forms, provided the in-house form includes the same or more information as the enclosed form.

END OF SECTION 00105



ATTENTION:

Request for Information

Name:

Company Name:

Phone:

Fax:

Date:

RFI # _____

ISSUE:

RESPONSE:

SIGNED BY: _____

DATE: _____

SECTION 00910 - UNIT PRICES

PART 1 – SCOPE OF WORK:

- A. The Owner/Architect is requesting **Unit Pricing** for the following items listed below under Part 3 - UNIT PRICE SCHEDULE.
- B. Each request shall have an associated Unit Price, which shall be attached to the Bid Form.

PART 2 – GENERAL:

- A. **Unit Pricing may be used for the following situations:**
 - 1. Unit pricing is requested for Project Work that may/may not occur, or be modified as to scope or quantity after the contract has been awarded.
 - 2. Unit Pricing shall include all additional costs of labor, materials, overhead, profit, fees and such other costs necessary for the work described.
 - 3. Unit Prices may be used for items already indicated on the Drawings and in the Specifications, and as installation costs for items whose quantity is yet to be determined. Unit Prices may also be used to repair Work, the scope of which may vary.
 - 4. Unit Prices may be used for items that are found to be unacceptable during field surveys and inspections after the Contract has been awarded and prior to performing the actual work.

PART 3 – UNIT PRICE SCHEDULE:

- A. All **Unit Price** items listed below shall be quoted. This **Schedule is included in the City’s Invitation to Bid in the Bid Form documentation under “Unit Price Bid” as additional information to the Lump Sum Bid requested.**

- 1. **Provide a unit cost per door to Remove and Replace an existing knob with a new levered lockset.**

UNIT COST \$_____per door

- 2. **Unit cost is requested to Remove and Replace existing VCT and vinyl base in associated area.**

UNIT COST \$_____per SF

End of Unit Price Schedule

END OF SECTION 00910

SECTION 00920 - ALTERNATES**PART 1 - GENERAL**

- A. An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain items that may be added to or deducted from Base Bid amount if the Owner decides to accept the corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.
- B. All Alternates listed below shall be quoted. This Schedule is included in the City's Invitation to Bid in the Bid Form documentation under "Section 2 – Material and Equipment Alternates" as additional information to the Lump Sum Bid requested.**
- C. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the Project.
- D. Notification: Immediately following Contract award, prepare and distribute to each party involved, notification of the status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to Alternates if applicable.
- E. Schedule: An "**Alternate Schedule**" is included at the end of this Section.
 - 1. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the alternate.
 - 2. Specification Sections may be referenced in the Schedule and may contain requirements for materials and methods necessary to achieve the Work described under each alternate.

PART 2 - EXECUTION

- A. The Contract Work may include any or all Alternates, which are listed below. All Alternates shall be appropriately included and noted separately with the Base Bid and submitted as part of the complete scope of Work as described below.**
- B. Provide all of the requested **Alternate** pricing.
 - 1. **Alternate** pricing shall be used to allow the **Owner** the option to add/delete work to the base construction pricing noted as Base Bid.
 - 2. The **Alternate** pricing shall be included in the Contract at the sole discretion of the **Owner** after the review of the budget and before awarding the contract.
 - 3. **Included in the Alternate Bid shall be: labor, materials, equipment, services, facilities and all items required to complete the Work and/or as further indicated on the drawings and in the specifications.**
- C. **Alternates Schedule follows on the next page. All ALTERNATE items shall be quoted and included as noted above in Part 1 – General line B.**

PART 3 - ALTERNATES SCHEDULE: All **Alternates** listed below shall be quoted.

ALTERNATE #1 - Eliminate the work associated with revising the Community Center Kitchen and adjacent Rooms as noted and detailed on the Demolition Plan Sht. D1.1 and Floor Plan Sht. A1.1 and associated Work indicated on the Mechanical and Electrical Documents.

DEDUCT COST \$ _____

ALTERNATE #2 - The Base Bid shall include removing the cementitious siding and building felt on the North, West and South sides of the Existing Teen Center, and installing new moisture-barrier wrap and new cement board siding and trim for a complete installation from sill to eve. All required trim around windows and doors shall be included.

Provide a Deduct Alternate for this Work noted above. **See Detail 4/D1.1.**

DEDUCT COST \$ _____

ALTERNATE #3 - The Base Bid shall be to provide and install Light Fixtures as noted on Sheet E1.2 per the LIGHTING FIXTURE SCHEDULE. The Contractor shall provide similar LED fixtures as those Scheduled and note whether the Cost below is a **Deduct** or **Add** to the Base Bid.

Provide an Alternate for LED Fixtures noted above.

DEDUCT **or** ADD COST \$ _____

ALTERNATE #4 - The Base Bid shall include modifying the existing shingles on the Teen Center to allow the new shingles on the new Construction to be dove-tailed together. This Alternate shall be to remove and replace all of the existing shingles and building felt on the Teen Center to match all of the new Construction shingles.

Provide an Add Alternate for this Work noted above.

ADD COST \$ _____

End of Alternate Schedule

END OF SECTION 00920

SECTION 01010 - SUMMARY OF THE WORK**PART 1 - GENERAL****1.01 DESCRIPTION OF THE PROJECT:**

- A. Provide all material and labor to complete the construction of **Bryant Community Center Addition/Renovation** as described and intended by the complete body of work represented in these Contract Documents – including:
1. Selective Demolition
 2. Sitework
 3. Foundations
 4. New Construction - etc

1.02 DESCRIPTION OF CONTRACT REQUIREMENTS

- A. Summary by Reference
1. The work can be summarized by reference to the requirements of the various Contract Documents, which in turn make reference to the requirements of other applicable provisions which control or influence the work; and these references can be summarized but are not necessarily limited to the following:
 - a. Document initiated by the City of Ann Arbor for this Project – noted as the “**City of Ann Arbor Invitation to Bid**”.
 - b. The Executed Owner-Contractor Agreement (typically not bound herewith).
 - c. The Drawings - which are listed in the "Drawing Sheets" as of the date of these Contract Documents are attached.
 - d. The Specification Sections - that are listed in the "Table of Contents" and bound within the Invitation to Bid noted above.
 - e. Any Addenda or Modifications to the Contract Documents, which may have been bound herewith (in this Project Manual) or distributed by transmittal subsequent to the binding hereof.
 - f. Governing regulations, which have a bearing on the performance of the work; copies can be obtained from or reviewed at the local, State or Federal Agency responsible for the regulation in each case.
 - g. Submittals (of every kind), copies of which are retained by the Contractor at the site.
 - h. Miscellaneous elements of information having a bearing on the performance of the work, such as reports of general trade union negotiations: copies must be obtained by the Contractor through normal channels of information.

PART 2 - SPECIAL CONSIDERATIONS:**2.01 GENERAL:**

- A. All products incorporated into the building construction shall be asbestos free. Construction managers and/or contractors may be required to submit a signed and notarized statement to the Owner to this effect for incorporation into the asbestos management plan.
- B. All painted/coated products and plumbing components incorporated into the building construction shall be lead free. Construction managers and/or contractors may be required to submit a signed statement to the Owner to this effect for incorporation into the lead inspection plan.

END OF SECTION 01010

SECTION 01045 - CUTTING AND PATCHING**PART 1 - GENERAL**1.01. **DESCRIPTION OF REQUIREMENTS**

- A. "Cutting and Patching" is hereby defined to include, but is not necessarily limited to, the cutting and patching of nominally completed and/or previously existing work, in order to:
- accommodate the coordination of new or revised work;
 - the installation of other work;
 - to uncover other work for access or inspection;
 - to obtain samples for testing or for similar purposes;
 - and is defined to exclude integral cutting and patching during the manufacturing, fabricating, erecting and installing process for individual units of work which may be defined in other areas of these specifications.
1. Drilling the work to install fasteners and similar operation are excluded from the definition of cutting and patching, but may have similar requirements.
 2. Alteration work as specified for existing work in order to accomplish revisions or to accommodate new work is specified separately, and may require cutting and patching but is not specified primarily as cutting and patching work.
 3. Excavating and associated operations of boulder removal, dewatering, shoring and bracing, removal of underground debris, penetration of rock and other barriers, backfilling, and similar work may be required as special forms of cutting and patching, but are recognized primarily as examples of related but separate categories of work not specified in this section.
 4. Restoring or removing and replacing non-complying work is specified separately from cutting and patching, but may require cutting and patching operations as specified herein.
- B. Refer to other sections of these Specifications, including Divisions 15 and 16, for additional cutting and patching requirements and limitations applicable to individual parts of the Work.
- C. **Notwithstanding additional directions, no other reference to 'Cutting and Patching' herein included shall exclude or modify the fact that the required Work shall be done by tradesmen skilled in dealing with the particular material/installation process requiring the Work.**

1.02. **INCONSISTENCIES:**

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

1.03. **QUALITY ASSURANCE**

- A. The Contractor is responsible to maintain all systems/structures required for the continuation, reuse or future use of the system/structure, as inferred by the Documents. Failure to coordinate these elements during 'cutting and patching' will not relieve the contractor from the responsibility and cost of repairing to acceptable use.
- B. Requirements for Structural Work:
1. Do not cut and patch structural work in a manner resulting in a reduction of load carrying capacity or load/deflection ratio.
 2. Prior to cutting and patching the following categories of work, obtain Architect's/Engineer's approval to proceed.
 - a. Major structural members including trusses, beams and columns.
 - b. Miscellaneous structural members, including lintels, equipment supports and similar categories or work.
 - c. Bearing walls.
- C. Operational and Safety Limitations:
1. Do not cut and patch operational elements or safety related components in a manner other than intended (including energy performance), in decreased operational life, in increased maintenance, or in decreased safety.

2. Prior to cutting and patching the following categories of work and similar categories where directed, obtain Architect's/Engineer's approval to proceed with cutting and patching as proposed in submittal by Contractor:
 - a. Primary operational systems and equipment
 - b. Control, communication, conveying, and electrical wiring systems
 - D. Visual Requirements:
 1. Do not cut and patch work exposed on the building's exterior or in the building's occupied spaces in a manner that would, in the Architect's opinion, result in lessening the building's aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work. Remove and replace work judged by the Architect to be cut and patched in a visually unsatisfactory manner.
- 1.04. SUBMITTALS:
- A. Proposals for Cutting and Patching: Where prior approval of cutting and patching is required, submit proposal well in advance of time work will be performed, and request approval to proceed. Include the following information, as applicable, in the proposal:
 1. Describe the nature of the work and how it is to be performed, indicating why cutting and patching is called for. Describe anticipated results of the work in terms of changes to existing work. Where applicable, include cost proposal and suggested alternatives to proposed cutting and patching procedure.
 2. List products to be used and firms/tradesmen to perform the work.
 3. Provide dates when work is expected to be performed.
 4. List utilities that will be disturbed or otherwise be affected by the work, including those that will be relocated and those that will be out of service temporarily. Indicate how long utility service will be disrupted.
 5. Where cutting and patching of structural work involves major structural members including trusses, beams and columns; miscellaneous structural members, including lintels, equipment supports and similar categories or work; bearing walls or the addition of or removal of reinforcement; submit details and engineering calculations to show how the cutting and patching is integrated with original structure to satisfy requirements.
 6. Architect's approval of cutting and patching work proposal does not waive the Architect's right to require subsequent complete removal and replacement of work found to be cut and patched in an unsatisfactory manner.

PART 2 - PRODUCTS

- 2.01 MATERIALS:
- A. General: Except as otherwise indicated, such directed by these Specifications or directed by the Project Architect, use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.
 1. Obtain approval of the Architect before using materials other than original or specified for patching and repairing.

PART 3 - EXECUTION

- 3.01 INSPECTION:
- A. Before cutting, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding if unsafe or unsatisfactory conditions are encountered.
 - B. Pre-Cutting and Patching Coordination Meeting: Before the start of cutting work, meet at the work site with all parties involved in cutting and patching, including mechanical and electrical

trades. Review areas of potential interference and conflict between the various trades. Coordinate layout of the work and resolve potential conflicts before proceeding with the work.

3.02 PREPARATION:

A. Temporary Support:

1. Provide adequate temporary support for work to be cut to prevent any form of structural failure. Do not endanger other work. It is the contractor's responsibility to have a qualified Engineer review/approve all shoring required to maintain the existing construction.

B. Protection:

1. **Provide adequate protection of other work and existing construction during cutting and patching to prevent damage.**
2. **Provide enclosures to limit exposure of adjacent areas to all debris – air-borne and solid. Keep adjacent areas, not a part of the Work, protected from all associated debris.**
3. **Provide protection of exterior work from adverse weather exposure.**
4. **Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas during normal work hours.**
5. Take all precautions to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.02 PERFORMANCE:

A. General: Employ skilled trades people to perform cutting and patching. Except as otherwise indicated or approved by Architect/Engineer, proceed with cutting and patching at earliest feasible time in each instance, and complete work without delay.

B. Cutting:

1. Cut work/existing construction by methods least likely to damage work/existing construction to be retained and work/existing construction adjoining. Review proposed procedure with original installer where possible, and comply with their recommendations.
2. In general, where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Cut holes and slots to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces. Coordinate with other Sections of these Specifications for specialized cutting relative to particular material and installations.
3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or a diamond core drill, unless required to tooth in other Sections of the Documents.
4. Comply with requirements of applicable sections of Division 2 where cutting and patching requires excavating and backfilling.
5. Before cutting, by-pass utility services such as pipe or conduit where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions shall be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching:

1. Patch with seams that are durable and as invisible as possible. Comply with specified tolerances for the Work.
2. Where feasible, inspect and test patched areas to demonstrate integrity of installation.
3. Restore exposed finishes of patched areas; extend, where necessary, finish restoration to retained adjoining work/existing construction in a manner that will eliminate evidence of patching and refinishing.
 - a. **Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat to a natural termination point or corner.**

4. Patch, repair or re-hang existing ceilings, scheduled to remain, as necessary to provide an even plane surface of uniform appearance against area of patch.
- D. Cleaning:
1. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit and similar features before painting or finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 01120 – PROJECT ALTERATION PROCEDURES**PART 1 - GENERAL****1.01 DESCRIPTION OF WORK:**

- A. Making all material, installations, alterations, relocations and temporary installations come together with existing construction.
- B. Removing or altering existing construction as indicated or required to complete the Work intended on the Documents.
- C. Providing “seamless matching” of existing construction with new installations.
- D. Providing temporary controls or barriers to protect personnel and property during construction
- E. Coordinate with **Section 01045 – Cutting and Patching** for additional information and more specifics of patching materials and Work.

1.02 SECTION INCLUDES:

- A. Products and installation for patching and extending Work.
- B. Transition and adjustments.
- C. Repair of damaged surfaces, finishes, and cleaning.
- D. Revision to existing Work as part of a Renovation.
- E. Temporary installations – dust partitions, fire separations, etc. – to be removed prior to occupancy.

1.03 RELATED SECTIONS:

- A. Section 01010 – Summary of Work
- B. Section 01039 – Project Coordination
- C. Section 01045 – Cutting and Patching
- D. Section 01500 - Construction Facilities and Temporary Controls
- E. Sections 02070 or 02072 – Building Demolition or Alterations

1.04 DEFINITIONS OF REQUIREMENTS:

- A. The following are definitions and examples of terms used herein and in the Construction Documents to describe construction procedures noted on the Documents.
- B. Removals:
 - 1. Removals shall be as indicated and as specified herein and in other sections of these Specifications and shall be performed in a neat and workmanlike manner to limits indicated or specified, or to minimum extent necessary or required for proper removal of existing material and installation of new work. Existing surfaces remaining after demolition, to which new work is to be applied, shall be left in a condition suitable for application of new work.
 - 2. Removals shall be performed without damage to adjacent retained work; however, where such work is damaged, Contractor shall patch, repair or otherwise restore same to its original or better condition in terms of performance characteristics and visual effect. In all cases the repair shall blend with the requirements of the new construction.
 - 3. All existing materials, fixtures, and equipment which have been removed or disconnected, but which are not indicated or specified for reuse in new work or called for to be turned over to Owner shall become property of Contractor and shall be removed from site by Contractor at his expense and legally disposed of. On-site storage or sale of salvaged items not designated for Owner reuse will not be permitted.
- C. Demolition:
 - 1. Demolition shall be the partial or complete elimination of existing construction.
 - 2. Whereas the Documents may show the limits of demolition, the contractor shall be responsible to determine the exact extent to complete the intent of the Documents and complete all Work required.
- D. Salvage:
 - 1. To be removed from present location with the intent of re-installation of the material/assembly in the Project at another location.

2. The Contractor shall take care in the removal and shall store/preserve the material/assembly in its present state until re-installation.
 3. Any material that is scheduled to be salvaged and will not allow reuse shall be immediately brought to the attention of the Architect for direction.
- E. Salvage/Turn over to Owner:
1. The Contractor shall take care in the removal and shall store/preserve the material/assembly in its present state until it is claimed by the Owner.
 2. Coordinate with Owner for location of storage or if material should be immediately turned over to the Owner.
- F. Debris:
1. Debris is the remains of a demolition, relocation or temporary installation procedure.
 2. Debris shall be placed in approved containers to prevent the spread and accumulation of dust and dirt. Debris shall be removed from the area of work as often as necessary, but not less than at least once at end of each work day. All such debris shall be removed from site by Contractor and legally disposed of.
 3. Construction areas, interior and exterior, must be kept in a neat and orderly fashion. Trash, debris and all unusable items must be removed from the site daily. Removal must be supervised.
- G. Protection:
1. Contractor shall take all necessary precautions to adequately protect personnel, and public and private property in the areas of work. Approved barriers and warning signs shall be provided to reroute personnel around areas of dangerous work.
 2. Temporary partitions (noted below) may be required of proper protection methods.
 3. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- H. Dust Control:
1. Dust resulting from removals shall be controlled so as to prevent its spread to occupied portions of the building and to avoid creation of a nuisance in surrounding areas.
 2. Existing spaces occupied by Owner's personnel shall be isolated from removal operations by means of temporary dust-tight barriers. Dust seals shall be installed on doors entering spaces of human occupancy. Gaskets or other means may be used provided whatever method is used will not impede the use of these exits in any manner during an emergency.

PART 2 -PRODUCTS

2.01 PRODUCTS FOR PATCHING AND EXTENDING WORK:

- A. New Materials: As typically specified in product sections; match existing Products and Work by patching and extending work in a uniform way.
1. Particular Specifications Sections may be included only for reference for material patching requirements, and should be used as needed.
- B. Type and Quality of Existing Products: Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

PART 3 -EXECUTION:

3.01 EXAMINATION:

- A. Coordinate with the existing construction and material to establish schedule and/or requirements of new installations.
- B. Verify that demolition/renovation is complete and areas are ready for installation of new Work if demolition is carried out by separate contractor.
- C. Beginning of alteration/restoration Work means acceptance of existing conditions.
- D. General:

1. See Drawings for notes, schedules, details, plans, etc. and see other Sections of these specifications to establish full extent of removal work required.
2. It is the Contractor's responsibility to coordinate the exact extent of modification with the intent of the Documents.

3.02 PREPARATION:

- A. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified or required for finished Work.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.
- E. Close openings in exterior surfaces to protect existing work [and salvage items] from weather and extremes of temperature and humidity. Insulate duct work and piping to prevent condensation in exposed areas.

3.03 REMOVALS:

- A. General – removing Work or materials from present construction:
 1. See Drawings for notes, schedules, details, plans, etc. and see other Sections of these specifications to establish full extent of removal work required.
- B. Masonry Walls and Portions of Masonry Walls for New Openings:
 1. See Section 3.01.E – above – for requirements of masonry work.

3.04 RELOCATIONS:

- A. General – removing Work or materials from present construction and reinstalling in future Work or other locations:
 1. See Drawings for notes, schedules, details, plans, etc. and see other sections of these specifications to establish full extent of work required.
 2. For items to be removed from existing construction or building, and to be relocated under this contract see Drawings and Sections 02070 or 02072 - if applicable.

3.05 INSTALLATION:

- A. Coordinate work of alterations and renovations to expedite completion sequentially and to accommodate continued Owner occupancy.
- B. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to original or specified condition in accordance with Section 01045 – Cutting and Patching.
- C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes in accordance with Section 01045 – Cutting and Patching.
- D. Project work areas: Complete including operational mechanical and electrical work and related services.
- E. In addition to specified replacement of equipment and fixtures, restore existing plumbing, heating, ventilation, air conditioning, electrical, and related systems to full operational condition.
- F. Re-cover and refinish Work that exposes mechanical and electrical work exposed accidentally during the work.
- G. Install Products as specified in individual sections.
- H. **See Section 01045 – Cutting and Patching for additional requirements.**

3.06 TRANSITIONS:

- A. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

- B. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line and at a natural line of division, and make recommendation to Architect/Engineer.

3.07 ADJUSTMENTS TO EXISTING CONSTRUCTION:

- A. Where removal of partitions, bulkheads, walls and or other material results in adjacent spaces becoming one: rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- B. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Architect/Engineer review.
- C. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- D. Fit work at penetrations of surfaces as specified in Section 01045.

3.08 REPAIR OF DAMAGED SURFACES:

- A. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections due to the installation or modifications of the Construction Manager.
- B. Repair substrate prior to patching finish.
- C. Where removals leave holes or otherwise damaged surfaces that will be exposed in the finished work, these holes and damaged surfaces shall be patched and repaired with materials and by methods which will result in equal or better work than the work being patched, both in performance characteristics and visual affect. Where work is to be applied to existing surfaces, removals and patching shall produce surfaces that are suitable for the provision of the new work. Patching shall be performed by workmen skilled in the trade involved and shall be performed in a neat and workmanlike manner. Finished surfaces of patched area shall match the existing adjacent surfaces as closely as possible as to texture and finish.
 - 1. **See Section 01045 – Cutting and Patching for additional requirements.**

3.09 FINISHES:

- A. Finish surfaces as specified in individual Product sections.
- B. Specification sections may be included for reference only providing information for finishing of existing materials or surfaces.
- C. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest natural intersection, transition to different material or terminus.

3.10 TEMPORARY PARTITIONS

- A. These can be temporary walls or construction to keep dust from entering occupied areas during construction operations. Install where required by construction to protect Owner occupied areas and equipment.
- B. **Construct required fire-partitions in compliance with UL Design No. U305 – at a minimum** - to separate areas of construction from continuing occupancy, and with the following details:
 - 1. Pack safing insulation tightly around all conduits, pipes, ducts and other obstructions passing through the partitions.
 - 2. Where partition will be exposed to weather, paint side exposed to the weather.
 - 3. Install fiberglass sill sealer between sole plate and floor, between top plate and ceiling or structural framing system and between studs and abutting vertical surfaces of wall, columns, etc.
- C. Repair any damage to any work that will be the final surface caused by erection and removal of temporary partitions. Repair to match adjacent existing surfaces to satisfaction of Architect.

3.11 PATCHING

- A. Where removals leave holes or otherwise damaged surfaces that will be exposed in the finished work, these holes and damaged surfaces shall be patched and repaired with

- materials and by methods which will result in equal or better work than the work being patched, both in performance characteristics and visual affect. Where work is to be applied to existing surfaces, removals and patching shall produce surfaces that are suitable for the provision of the new work.
- B. Patching shall be performed by workmen skilled in the trade involved and shall be performed in a neat and workmanlike manner.
 - C. Finished surfaces of patched areas shall match the existing adjacent surfaces as closely as possible as to texture and finish.
 - D. **See Section 01045 – Cutting and Patching for additional requirements.**

3.12 MAINTAINING ACCESS TO SITE AND BUILDINGS:

- A. **The premises may be occupied during part of the period of alteration and renovation work. Contractor shall not restrict access to building or site by employees, students, delivery operations, etc.**
- B. Access may be restricted as needed, but all barriers shall be coordinated with the Owner for required occupancies and shall not restrict the emergency egress pathways required for occupancy.

END OF SECTION 01120

SECTION 01200 - PROJECT MEETINGS**PART 1 – GENERAL****1.01 SECTION INCLUDES:**

- A. Preconstruction conference
- B. Site mobilization conference
- C. Progress meetings
- D. Special installation Meetings
- E. Final Inspection by State or Local governing Agencies

1.02 RELATED SECTIONS:

- A. Section 01400 – Field Engineering and Quality Control Services
- B. Section 01700 - Contract Closeout

1.03 CONTRACTOR RESPONSIBILITIES:

- A. It is the responsibility of the Contractor to:
 - 1. Establish an appointment for all meetings during the Construction period.
 - 2. Coordinate with the required participants for their availability
 - 3. Provide a location or venue for each meeting.
 - 4. Provide an agenda and distribute same prior to meeting to all participants.
 - 5. Take notes and publish Meeting Notes to all present.

1.04 PRE-CONSTRUCTION CONFERENCE:

- A. Owner/Architect will schedule a conference after Notice of Award and prior to start of construction activities.
- B. Attendance Required: Owner, Architect/Engineer and their consultants, Contractor's Superintendent, subcontractor's superintendent, and, optionally - any other suppliers, manufacturers, and other concerned parties shall be represented by persons authorized to conclude matters relating to the Work.
- C. Typical Agenda:
 - 1. Execution of Owner-Contractor Agreement
 - 2. Submission of executed bonds and insurance certificates
 - 3. Distribution of Contract Documents
 - 4. Provide submission of list of subcontractors. Review list of products, Schedule of Values, and progress schedule.
 - 5. Designation of personnel representing the parties in contract and the Architect
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications, Applications for Payments, proposal requests, Change Orders and contract closeout procedures
 - 7. Scheduling and work sequence.
 - 8. Submission of submittal schedule
- D. The Contractor shall prepare resolutions to a number of Agenda items noted above for discussion during the Pre-Construction Meeting.

1.05 SITE MOBILIZATION CONFERENCE:

- A. Owner will schedule a conference at the project site prior to contractor occupancy or include as part of the Pre-Construction Meeting.
- B. Attendance required: Owner, Architect/Engineer, Contractor, Contractor's superintendent, and Electrical and Mechanical Contractors.
- C. Typical Agenda:
 - 1. Use of premises by Owner and Contractor
 - 2. Owner's requirements and continued occupancy.
 - 3. Construction facilities and controls provided by Contractor.
 - 4. Temporary utilities provided by owner.

5. Survey and building addition layout
 6. Security and housekeeping procedures
 7. Schedules
 8. Procedures for testing
 9. Procedures for maintaining record documents.
 10. Requirements for start-up of equipment
 11. Inspection and acceptance of equipment put into service during construction period.
- D. The Contractor shall prepare resolutions to a number of Agenda items noted above for discussion during the Pre-Construction Meeting.

1.06 PROGRESS MEETINGS:

- A. Contractor will schedule and administer meetings throughout progress of work at minimum of once-per-month intervals.
1. Contractor will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within three (3) days to Architect, Owner, participants and those affected by decisions made.
- B. Attendance required: Job superintendent, major subcontractors and suppliers, Owner and Architect as appropriate to agenda topics for each meeting.
- C. Typical Agenda: Review minutes of the previous Progress Meeting. Review significant items that could affect progress. Include topics appropriate to the current status of the Project including, but not limited to:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions
 4. Identification of problems that impede planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period
 10. Coordination of projected progress
 11. Maintenance of quality and work standards
 12. Effect of proposed changes on progress schedule and coordination
 13. Review documentation for future payment requests.
 14. Other business relating to work
- D. Construction Schedule: Review progress since last meeting. Determine where each activity is in relation to the Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
1. Review the present and future needs of each entity present, including such items as:
 - a. Time
 - b. Sequences
 - c. Deliveries
 - d. Shop Drawing Logs
 - e. Off-site fabrication problems
 - f. Site utilization
 - g. Temporary facilities and services
 - h. Quality and work standards
 - i. Change Orders.
- E. No later than three (3) days after each Progress Meeting, the Contractor will distribute copies of minutes of the Meeting to each party present and to parties who should have been present.

1.07 SPECIAL INSTALLATION MEETINGS:

- A. Pre-installation meeting: Conduct a meeting before each activity that requires special coordination with other construction. The installer and representative of manufacturers and fabricators involved in the installation, and coordination or integration with other materials and installations that have preceded or will follow - shall attend. Advise the Architect/Engineer of scheduled meeting dates four days in advance.
 - 1. Review progress of other activities and preparations for the activities under consideration at each conference, including time schedules, manufacturer's recommendations, weather limitations, substrate acceptability, compatibility problems and inspection and testing requirements.
 - 2. Record proceedings of each meeting, along with the approved schedule. Promptly distribute the meeting record to everyone concerned, including the Owner and Architect/Engineer.
 - 3. Do not proceed if the meeting cannot be successfully concluded. Resolve impediments and reconvene the meeting at the earliest feasible date.
- B. Inspection of Conditions: The Installer of each component shall inspect the substrate and conditions under which Work is performed. The Installer shall report all unsatisfactory conditions in writing to the Contractor. Do not proceed with the Work until unsatisfactory conditions have been corrected.
- C. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that they are more stringent than requirements in the Contract Documents.
- D. Inspection of Material: Inspect material immediately upon delivery and again prior to installation. Reject damaged and defective items.
- E. Provide attachment and connection devices and methods necessary for securing each construction element. Secure each construction element true to line and level, and within recognized industry tolerances. Allow for expansion and building movement.
- F. Visual Effect: Provide uniform joint widths in exposed Work. Arrange joints to obtain the best visual effect. Refer questionable choices to the Architect/Engineer for final decision.
- G. Recheck measurements and dimensions of the Work before starting installation.
- H. Install each component during weather conditions and project status that will ensure the best possible results in coordination with the entire Work. Isolate incompatible work and materials as necessary to prevent deterioration.
- I. Coordinate temporary enclosures with inspections and tests, to minimize uncovering completed construction for that purpose.
- J. Mounting Heights: Where mounting heights are not indicated, install components at industry recognized standard heights for the application indicated. Refer questionable mounting height choices to Architect/Engineer for final decision.

END OF SECTION 01200

SECTION 01300 - SUBMITTALS**PART 1 - GENERAL**1.01 **SECTION INCLUDES:**

- A. Construction progress schedules
- B. Product Submittal Procedures and Schedules
- C. Shop Drawings
- D. Dimensions
- E. Proposed Products list
- F. Samples
- G. Manufacturers' instructions

1.02 **RELATED SECTIONS:**

- A. Section 01400 - Quality Control: Manufacturers' field services and reports.
- B. Section 01600 - Material and Equipment: For Product substitutions.
- C. Section 01700 - Contract Closeout: Contract warranty and manufacturer's certificates and closeout submittals.

1.03 **CONSTRUCTION PROGRESS SCHEDULES:**

- A. Submit initial progress schedule in duplicate within 15 days after date of Owner-Contractor Agreement for Architect review.
- B. Revise and resubmit as required.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a horizontal bar chart with a separate line for each major section of work or operation, identifying first workday of each week.
- E. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of work at each submission.
- G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and under allowances.
- H. Indicate key dates for coordination of vacation of contract limits, removal of existing building components designated as the responsibility of the Owner, and other milestones affecting construction progress which require coordination with the Owner's operation.

1.04 **PRODUCT/SHOP DRAWING SUBMITTAL PROCEDURES:**

- A. Prepare Submittal and Shop Drawing Schedule and submit to the Architect/Engineer for review within 15 days after date of Owner-Contractor Agreement. Schedule shall include a tabular breakdown, by specification Section, of all required submittals as listed in each Section, the anticipated submittal date of each item, and when return is required in order to meet construction schedules.
- B. **Allow a minimum of ten (10) working days for Architect/Engineer review of submittals.**
- C. Transmit each submittal with AIA Form G810, or Contractor's standard transmittal form as acceptable to Architect.
 - 1. Transmit the Submittal/Product sample directly to the responsible party. Example - If the submittals are Mechanical, send directly to the Mechanical Engineer with a copy transmitted to the Architect for their record/file. This procedure shall be similar for all other consulting parties. Subsequently, the Engineer shall transmit all reviewed Submittals to the Architect for their review/comment and final transmittal to the Contractor. This shall be the normal procedure for all Product Submittals. Coordinate with the Architect for products that do not have a clearly defined responsibility.
 - 2. Submit two (2) copies of each shop drawing submitted, plus one original that will be used as a master to be copied and distributed by the Contractor to all pertinent parties. The

Contractor shall be responsible for duplications so that the Architect/Engineer/Owner has appropriate information.

3. **Electronic files are preferred for Shop Drawing Review Submittals.**
 - a. Submit an electronic file in the form of a .PDF file or a series of .DPF files.
 - b. If the particular Shop Drawing is the responsibility of an Architect's consultant, transmit to consultant and simultaneously to the Architect for record.
 - c. Transmit an electronic copy of a transmittal with all information similar to AIA G810.
 - d. The contractor shall have "stamped and noted" all of his responsibilities on the electronic version of the document.
 - e. The Architect will make all notes, comments and stamps electronically in the .PDF file.
 - f. The Contractor shall receive and subsequently transmit to appropriate subcontractors the Shop Drawings in paper or electronic form as required.
 - D. Sequentially number the transmittal forms. Resubmittals shall have original number with an alphabetic suffix.
 1. Revise and resubmit submittals as required, identify all changes made since previous submittal. Renumber the subsequent submittals accordingly.
 - E. Identify project, Contractor, subcontractor or supplier; pertinent drawing sheet and detail number(s), and specification Section number, as appropriate.
 - F. **Apply Contractor's stamp, signed or initialed, certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the work and Contract Documents. Submittals not marked "Reviewed and Approved" and stamped by the Contractor prior to delivery to the Architect shall be returned unreviewed.**
 - G. Schedule submittals to expedite the project, and deliver to the appropriate business address. As agreed to by the Architect/Contractor – send Review copies directly to the Engineer and a transmittal/record copy to the Architect. Coordinate submission of related items.
 - H. Provide space for Contractor and Architect/Engineer review stamps.
 - I. Identify variations from contract documents and product or system limitations that may be detrimental to successful performance of the completed work.
 - J. Distribute copies of reviewed submittals to concerned subcontractors/Owner. Instruct parties to promptly report any inability to comply with provisions.
- 1.05 SHOP DRAWINGS RESPONSIBILITIES:
- A. The Architect is limited in responsibility of Shop Drawing Review as stated in AIA Document A201-2007 – General Conditions of the Contract for Construction, as herein stated, and referenced elsewhere in these Specifications.
 - B. **The Architect will not accept Shop Drawings unless properly reviewed by the subcontractor/supplier and the General Contractor/Construction Manager. The Architect is responsible for design concept as expressed in the Contract Documents. The Contractors are responsible for installation means and integration into other work of the Project. The Architect will not review submitted Shop Drawings unless the Contractor has Approved and stamped each submittal, and noted their responsibility to 'Field Verify' dimensions where applicable, prior to submission to the Architect.**
 - C. Refer to Section 01600 – Product Substitutions for proper procedures regarding Substitution Requests.
 - D. Prior to and after review, reproduce and distribute in accordance with Article on Product Submittal Procedures noted above and for Record Documents described in Section 01700 - Contract Closeout.
- 1.06 DIMENSIONS:
- A. The Contractor shall be solely responsible to field measure project conditions prior to submitting Shop Drawings and shall be solely responsible to ensure that dimensions noted on Shop Drawings will be properly accommodated by related construction that takes place after Shop Drawings have been approved.

- B. Any dimensions noted by the Architect on any Shop Drawings shall be determined to be a requirement of the particular detail or installation and shall be coordinated with Field Conditions by the Contractor to be sure that all dimensions and material fit. Any required changes shall be noted to the Architect immediately.
- C. The Architect shall not be requested to fill in dimensions that should be associated with Field Conditions. This is the responsibility of the Contractor.

1.07 PROPOSED PRODUCTS LIST:

- A. Within 15 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.08 SAMPLES:

- A. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finish from the full range of manufacturers' standard colors (unless noted otherwise in individual section), textures, and patterns for Architect's selection.
- C. Include identification on each sample, with full project information.
- D. Submit the number or samples specified in individual specification sections; one of which will be retained by Architect/Engineer.
- E. Reviewed samples that may be used in the work are indicated in individual specification sections.

1.09 MANUFACTURER'S INSTRUCTIONS:

- A. When specified in individual specification sections, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for product data.
- B. The Contractor shall identify conflicts between manufacturer's instructions and contract documents.

END OF SECTION 01300

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. Temporary Utilities: Electricity, lighting, heat, ventilation, water and sanitary facilities.
- B. Temporary Controls: Barriers, enclosures and fencing, protection of the work and water control.
- C. Construction Facilities: Site access, parking, progress cleaning, project signage, and temporary buildings.

1.02 RELATED SECTIONS:

- A. Section 01010 – Summary of Work
- B. Section 01019 – Contract Considerations

1.03 TEMPORARY ELECTRICITY:

- A. Connect to existing power service. Power consumption shall not disrupt Owner's need for continuous service.
- B. Provide temporary electric feeder from existing building electrical service at location as directed. Power consumption shall not disrupt Owner's need for continuous service.
- C. Owner will pay cost of energy used. Exercise measures to conserve energy.
- D. Permanent convenience receptacles may be utilized during construction.
- E. Provide adequate distribution equipment, wiring and outlets to provide single-phase branch circuits for power and lighting
- F. If available electrical service is not adequate for Contractor's equipment, the Contractor shall provide temporary power sources and devices on site for his equipment at no cost to the Owner.

1.04 TEMPORARY LIGHTING:

- A. Provide and maintain lighting for construction operations.
- B. Provide and maintain 1 watt/sq. ft. lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. Maintain lighting and provide routine repairs.
- E. Permanent building lighting may be utilized during construction.

1.05 TEMPORARY HEAT:

- A. Utilize Owner's existing heat plant, extend and supplement with temporary heat devices as required to maintain specified conditions for construction operations.
- B. Owner will pay cost of energy used. Exercise measures to conserve energy. Enclose building prior to activating temporary heat in accordance with Article 1.13 - Exterior enclosures in this section.
- C. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- D. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.06 TEMPORARY VENTILATION:

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes vapors, or gases.
- B. Provide fans, dehumidifiers, etc. to properly deal with dust, odors, curing and drying of material as required.

- 1.07 TEMPORARY WATER SERVICE:
- A. Connect to existing water source for construction operations.
 - B. Owner will pay cost of water used. Exercise measures to conserve water.
 - C. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.
- 1.08 TEMPORARY SANITARY FACILITIES:
- A. Provide and maintain required facilities and enclosures.
 - B. Existing facilities shall not be used. Provide and maintain required facilities outside of the existing Community Center. Locate in a discrete area away from the building's main entry. Coordinate with Owner for exact location.
 - C. Existing facilities shall not be used.

PART 2 - CONTROLS

- 2.01 BARRIERS:
- A. Provide 6 foot high chain link fencing around the contract limits to prevent unauthorized entry to construction areas during non-work hours and to allow for continued use of the site and building areas by the owner and the public, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
 - B. Provide protection for plant life designated to remain. Replace damaged plant life.
 - C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.
- 2.02 FENCING:
- A. Construction: Chain link
 - B. Provide 6 foot high fence around construction staging area and contract limits. Equip with vehicular gates with locks.
- 2.03 WATER CONTROL:
- A. Grade site to drain. Maintain excavations free of water. Provide, operate and maintain pumping equipment.
 - B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
 - C. Coordinate with requirements of State and County jurisdictions for barriers and controls.
- 2.04 INTERIOR ENCLOSURES:
- A. Provide temporary partitions as required to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
 - B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces.
 - C. Provide a one (1) hour fire resistance rating and 1-" TFSB sound insulation within the wall to provide an STC rating of 45 in accordance with ASTM E90 for all separations between Owner occupied areas and construction.
- 2.05 PROTECTION OF INSTALLED WORK:
- A. Protect installed work and provide special protection where specified in individual specification Sections.
 - B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.
 - C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
 - D. Protect finished floors, stairs and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

2.06 PROGRESS CLEANING:

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- C. Remove waste materials, debris, and rubbish from site periodically and dispose off-site.

2.07 SECURITY:

- A. Provide security and facilities to protect work, and existing facilities and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with Owner's security program, if applicable.

PART 3 - FACILITIES

3.01 PARKING

- A. Coordinate with the Owner for availability of existing parking on-site.

3.02 FIELD OFFICES AND/OR SHEDS:

- A. Coordinate with Owner for an existing location that may be used for an Office. Provide office equipment (FAX, copiers, etc.) and do not use equipment of the Owner.

END OF SECTION 01500

SECTION 01600 - PRODUCT SUBSTITUTION REQUESTS**PART 1 - GENERAL**

- A. **Product Substitution Requests** proposed by the Contractor **after award of the Contract** for deviation from specified products, materials, equipment, and/or methods of construction required by Contract Documents are considered **"substitution" requests**.
- B. A Contractor's **"Substitution Request Form"** (attached herein) may be considered and Approved by the Architect when one or more of the following conditions are satisfied, as determined by the Architect. If none apply, **Product Substitution Requests** will be returned without action except to record noncompliance with Contract Documents. The Product/Installation substituted will only be considered if:
1. Extensive revisions to Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of Contract Documents.
 3. The request is timely, fully documented and properly submitted.
 4. The specified product or method of construction cannot be provided within the Contract Schedule as previously established. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 6. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate contractors, and similar considerations.
 7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
 9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution shall provide the required warranty.
- C. **Substitution Requests** are permitted under the following terms:
1. All substitution requests must be made directly by the General Contractor / Construction Manager (GC/CM) to the Architect. No substitution requests will be accepted from sub-contractors.
 2. All substitution requests must be accompanied by a signed, fully completed "Substitution Request Form" found at the end of this Section.
 - a. Submit 3 copies of the "Substitution Request Form" completely filled out.
 - b. In addition, provide the following information, as appropriate:
 - i. **Samples, where applicable or requested.**
 - ii. **A statement indicating the substitution's effect on the Construction Schedule compared to the Schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.**
 - iii. **Contractor's waiver of rights to additional payment or time that may be necessary because of the substitution's failure to perform adequately.**
 3. The General Contractor/Construction Manager has reviewed the Request and feels it is necessary or preferable for the completion of the Project, and the GC/CM confirms that the schedule will not be negatively impacted.
 4. Requests for substitution will be considered if received within 60 days after commencement of the Work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Architect.
 5. Comply with the requirements of this Specification for all Submittals which are intended to represent an *'or approved equal'* clause wherever individual Specification Sections allow such for specified products and/or methods.
 6. **In all cases where a Submittal does not represent an *'or approved equal'* substitution, except where the substitution is required due to the Architect's responsibilities, the Architect shall be compensated for the time involved in evaluating the Substitution**

Request and for any and all revisions to the Documents required by the aforementioned change. The rate of compensation shall be: \$100/hr per staff time involved.

- D. Architect's Actions:
1. Within one week of receipt of the Substitution Request Form, the Architect may request additional information necessary for evaluation.
 2. Within 2 weeks of receipt of the request, or one week of receipt of additional information, which ever is later, the Architect will notify the Contractor of acceptance or rejection.
 3. **If a decision on use of a substitute cannot be made within the time allocated, the product specified shall be incorporated into the Work.**
 4. Acceptance of the **Substitution Request Form** will be in the form of a Change Order issued by the GC/CM after incorporation into the Work if the Contract amount is affected and Contracts have been finalized.
- E. The following are **not** considered substitutions:
1. When an item or material is generic and the Contractor's proposed item is different only in its name, size, color, etc., and not specifically required to comply with an 'or equal' standard.
 2. Substitutions requested made during the bidding period or included with the Bid Form on the Bid Due Date, and accepted prior to award of Contract. See Section 00100 – Instructions to Bidders for additional information.
 3. Revisions to Contract Documents requested by the Owner or Architect.
 4. Specified options of products and construction methods included in Contract Documents.
 5. Compliance with governing regulations and orders issued by governing authorities.
- F. **The Contractor's submittal and, if applicable, the Architect's acceptance of Shop Drawings, Product Data, and/or or Samples which do not comply with the Specifications, does not constitute an acceptable or valid request for substitution, nor does it transfer responsibility for meeting all provisions set forth in these Contract Documents from the Contractor to the Architect.**
- G. **The Architect/Owner maintains the right to reject any and all Substitution Requests at their own discretion.**

END OF SECTION 01600

“Substitution Request Form” follows on pages 3 and 4.

PRODUCT SUBSTITUTION REQUEST FORM

The General Contractor or Construction Manager (GC/CM): _____ shall initially review this Substitution Request and, if believing it to be relevant, forward it for review by the Architect.

Project: _____

The Sub-Contractor - _____ hereby submits for your consideration the following Product/Installation Substitution instead of the specified product of means of installation for the above noted Project:

| <u>Spec. Section</u> | <u>Section Paragraph</u> | <u>Original Product</u> |
|----------------------|--------------------------|-------------------------|
| _____ | _____ | _____ |

Proposed Substitution: (explain using attachments as needed): _____

Attach complete **technical data** including laboratory tests, if applicable. Include complete information for modification(s) to Documents and/or Specifications required for proper installation as made necessary by proposed Substitution.

Provide the following information, using additional sheets if necessary **FOR POST-BID SUBSTITUTION REQUESTS ONLY:**

A. If the substitution request is accepted, will the Contractor proposing the substitution pay for any and all changes to the building design, including engineering, detailing, and plan review / permit costs, etc. created by the acceptance of the proposed substitution?

signify: Yes () or No () – comments: _____

B. Does the GC/CM and Contractor understand that, should the proposed substitution item(s) fail to meet or exceed all the requirements of the specified item(s), the substitution may be rejected at the Architect’s discretion and, if so, the GC/CM and/or Contractor will still be required to reimburse the Architect directly, on a \$100.00/hr. basis, for the time taken to review the rejected substitution?

signify: Yes () or No () – comments: _____

C. Does the substitution affect dimensions or material fit shown or implied in the drawings?

signify: Yes () or No () – comments: _____

D. What effect does the substitution have on other trades?

E. What are the differences between the proposed substitution and specified items?

F. Is there a material/time benefit to the Owner or Project if this substitution is accepted?

signify: Yes () or No () – comments: _____

G. Does the proposed substitution represent a cost savings to the Owner or Project?

signify: Yes () or No () – comments: _____

If so, what is the savings? _____

H. Manufacturer's guarantees of proposed and specified items are:

Same () Different () (explain on attachment if necessary)

The GC/CM states that the function, appearance, and quality of the substitution item(s) is/are equivalent or superior to the specified item and that items A through H above are correct and binding. The GC/CM shall affirm by signature below:

Submitted By:

Signature

Date

Firm Name

Address

Telephone

For use by Architect or Consultant:

Accepted

Accepted as noted

Rejected

Received too late

By: _____

Date: _____

Remarks: _____

SECTION 01700 CONTRACT CLOSEOUT**PART 1 - GENERAL**1.01 **SECTION INCLUDES:**

- A. Final Acceptance
- B. Starting Systems
- C. Record Documents
- D. Operation and Maintenance Manuals
- E. Warranties

1.02 **RELATED SECTIONS:**

- A. Section 01019 – Contract Considerations
- B. Section 01039 – Project Coordination
- C. Section 01200 – Project Meetings
- D. Section 01400 – Field Engineering and Quality Control Services

PART 2 – FINAL ACCEPTANCE2.01 **SECTION INCLUDES:**

- A. Substantial Completion
- B. Final Inspection

2.02 **SUBSTANTIAL COMPLETION**

- A. Before requesting inspection for certification of Substantial Completion, the Contractor shall complete the following:
 - 1. In the Application for Payment that coincides with the date for which Substantial Completion is claimed, show 100% completion for the portion of the Work claimed substantially complete.
 - 2. Submit specific warranties and similar documents.
 - 3. Submit record drawings and similar record information.
 - 4. Complete final clean-up.
- B. When contractor considers that the work is substantially complete, he shall prepare for the Architect a list of items to be complete or corrected.
- C. Upon request by the Owner, the Architect will make an inspection to determine the status of completion.
- D. When the Architect, on basis of inspection, concurs that the work is substantially complete, he will:
 - 1. Prepare a Certificate of Substantial Completion of AIA Form G704, accompanied by Contractor's list of items to be completed or corrected, as verified and amended by the Architect.
 - 2. Submit the Certificate to Owner and Contractor for their written acceptance of the responsibilities assigned to them in the Certificate.

2.03 **PROJECT COMPLETION REQUIREMENTS:**

- A. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions. Administrative actions and submittals that precede or coincide with this application include:
 - 1. Occupancy permits.
 - 2. Warranties and maintenance agreements
 - 3. Test/adjust/balance records
 - 4. Maintenance instructions
 - 6. Change-over information related to Owner's occupancy.
 - 7. Final cleaning
 - 8. Application for reduction of retainage, and consent of surety

- B. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final payment application include:
 - 1. Completion of Project closeout requirements
 - 2. Completion of items specified for completion after Substantial Completion.
 - 3. Transmittal of required Project construction records to Owner.
 - 4. Proof that tax, fees and similar obligations have been paid.
 - 5. Change of door locks to Owner's access.

2.03 FINAL INSPECTION

- A. Before requesting inspection for certification of final acceptance and final payment, the Contractor shall submit the following to the Architect:
 - 1. Guarantees and warranties as required by other sections.
 - 2. Evidence of payment and release of liens, per all requirements stated in the General and Supplementary Conditions.
 - 3. A final statement, accounting for changes to the Contract Sum.
 - 4. A copy of the final inspection list stating that each item has been completed or otherwise resolved for acceptance.
 - 5. Consent of surety to final payment.
 - 6. Evidence of continuing insurance coverage complying with insurance requirements.
- B. When the Contractor considers that the work is complete, he shall submit written notice to the Architect that the Work is ready for final inspection and acceptance, and also include a final Application for Payment.
- C. The Architect will make an inspection to verify the status of completion with reasonable promptness.
- D. When the Architect finds the Work acceptable under the Contract Documents, he will issue a Project Certificate for Payment that will approve the final payment due the Contractor.

PART 3 – STARTING SYSTEMS

3.01 SECTION INCLUDES:

- A. Starting systems
- B. Demonstration and instructions
- C. Testing, adjusting, and balancing

3.02 RELATED SECTIONS:

- A. Section 01019 – Contract Considerations
- B. Section 01400 - Quality Control: Manufacturers field reports.

3.03 STARTING SYSTEMS:

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative and General Contractor/Construction Managers' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01300 that equipment or system has been properly installed and is functioning correctly.

3.04 DEMONSTRATION AND INSTRUCTIONS:

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of final inspection.
- B. Demonstrate Project equipment and instruct in a classroom environment located at the project site and instructed by a qualified manufacturers' representative knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months of substantial completion.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.05 TESTING, ADJUSTING, AND BALANCING:

- A. The contractor will employ, and pay for services of an independent firm to perform testing, adjusting, and balancing. These services shall be coordinated by the Construction Manager.

PART 4 – “AS-BUILT” DOCUMENTS

4.01 REQUIREMENTS OF RECORD DOCUMENTS:

- A. All sub-contractors shall be responsible for their own Trade work to record work that is hidden and/or varies in any way from the Contract Documents.
- B. Contractors/Trades shall maintain changes as they occur for compilation when the Project Closeout approaches.
- C. Record Drawings are required to establish the location of concealed work which may deviate from details or dimensions indicated on the Contract Documents. Record Drawings are required for information only, but are intended to provide complete information for “As-Built” drawings.
- D. The General Contractor shall:
 - 1. Record all changes that occur during Construction that vary from the Contract Documents and may vary from the information indicated in the Documents.
 - 2. Be responsible to collect drawings and documents of all concealed work to indicate locations when not directly observable.
 - 3. Work with sub-contractors to verify a complete set of “As-Built” documents is received from each Trade as appropriate.
 - 4. Compile all information in “As-Built” Documents and provide same to the Owner in the format and media noted below:
 - a. Provide a hard, paper-copy of all mark-ups and changes in the Work.
 - b. Provide all information in “.PDF” format written on a computer disk – CD or DVD.

PART 5 – OPERATION AND MAINTANANCE MANUALS

5.01 SECTION INCLUDES:

- A. Format and content of manuals
- B. Instruction of Owner's personnel
- C. Schedule of submittals

5.02 RELATED SECTIONS:

- A. Section 01300 - Submittals:
- B. Section 01400 - Quality Control: Manufacturers' instructions
- C. Section 01610 - Material and Equipment: Systems demonstration

D. Individual Specifications Sections: Specific requirements for operation and maintenance data

5.03 QUALITY ASSURANCE:

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

5.04 GENERAL FORMAT:

A. Prepare data in the form of an instructional manual.

B. Binders: Commercial quality, 8-1/2 x 11 inch, three D side ring binders with durable covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

C. Cover: Identify each binder with typed or printed title **OPERATION AND MAINTENANCE INSTRUCTIONS**; identify title of Project; identify subject matter of contents.

D. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.

E. Text: Manufacturer's printed data, or typewritten data on 20-pound paper.

F. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

G. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Construction Manager, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions arranged by system and/or process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties.

5.05 MANUAL FOR MATERIALS AND FINISHES:

A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.

B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional Requirements: As specified in individual Product specification sections.

E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

5.06 MANUAL FOR EQUIPMENT AND SYSTEMS:

A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions.

- Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
 - C. Include color-coded wiring diagrams as installed.
 - D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.
 - E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - F. Provide servicing and lubrication schedule, and list of lubricants required.
 - G. Include manufacturer's printed operation and maintenance instructions.
 - H. Include sequence of operation by controls manufacturer.
 - I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - J. Provide control diagrams by controls manufacturer as installed.
 - K. Provide General Contractor's coordination drawings, with color-coded piping diagrams as installed.
 - L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
 - M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - N. Include test and balancing reports as specified in Section 01400.
 - O. Additional Requirements: As specified in individual Product specification sections.
 - P. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

5.07 INSTRUCTION OF OWNER PERSONNEL:

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
- B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

5.08 SUBMITTALS:

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit 1 copy of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.

PART 6 - WARRANTIES

6.01 SECTION INCLUDES:

- A. Preparation and submittal of warranties.
- B. Time and schedule of initial operation of equipment

6.02 RELATED SECTIONS:

- A. General Conditions - AIA Document A201 or A201-C/M: Warranties and correction of work

- B. Section 01019 – Contract Considerations
- C. Individual Specifications Sections: Warranties required for specific Products or Work.

6.03 FORM OF WARRANTY SUBMITTALS:

- A. Bind in commercial quality 8-1/2 x 11 inches, three D side ring binders with durable covers.
- B. Cover: Identify each binder with typed or printed title WARRANTIES with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- C. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.
- D. Separate each warranty with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

6.04 PREPARATION OF SUBMITTALS:

- A. Obtain warranties executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties until time specified for submittal.

6.05 TIME OF SUBMITTALS:

- A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
- B. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period. Coordinate with the Construction Manager for exact time of submittal.

END OF SECTION 01700

SECTION 02070 - DEMOLITION AND ALTERATION WORK**PART 1 - GENERAL**1.01 **DESCRIPTION**

- A. Extent of Selective Demolition Work is indicated on Drawings and described herein.
- B. **In all cases – modify existing construction to make acceptable for new construction.**
- C. Types and requirements of Selective Demolition Work:
 - 1. Removing misc. equipment, hardware, shelving and brackets, furnishings, etc.
 - 2. In every case, items shown or noted to be “demolished”, “removed”, “relocated”, or “salvaged” shall be removed in their entirety, including all supports, fasteners, and accessories; whether or not shown or noted.
 - 3. Salvage requires the selective, careful removal of an items with the intent to secure said item to be turned over to the Owner for his use, or for subsequent installation in the new Work – as directed.
 - 4. Demolition requires the selective removal and subsequent offsite disposal of the following:
 - a. Portions of building structure indicated on drawings and as required to accommodate new construction.
 - b. Removal of interior partitions as indicated on drawings.
 - c. Removal of doors and/or frames indicated as to “remove”.
 - d. Removal of Built-in casework indicated “remove”.
 - e. Removal and protection of existing fixtures and equipment items indicated “salvage”.
- D. Removal/Demolition Work Specified Elsewhere:
 - 1. Cutting non-structural concrete floors and masonry walls for underground piping and ducts, and for above grade piping, ducts and conduit is included with the work of the respective mechanical and electrical divisions 15 and 16 specifications sections.
- E. Related Work Specified Elsewhere:
 - 1. Remodeling construction work and patching is included within the respective sections of specifications, including removal of materials for re-use and incorporated into remodeling or new construction.
 - 2. Relocation of pipes, conduits, ducts other mechanical and electrical work are specified by respective trades.

1.02 **DESCRIPTION OF REQUIREMENTS**

- A. Removals:
 - 1. Removals shall be as indicated and as specified herein and in other sections of these Specifications and shall be performed in a neat and workmanlike manner to limits indicated or specified or to minimum extent necessary or required for proper installation of new work. Existing surfaces remaining after removals to which new work is to be applied shall be left in a condition suitable for application of new work.
 - 2. Removals shall be performed without damage to adjacent retained work; however, where such work is damaged, Contractor shall patch, repair or otherwise restore same to its original or better condition in terms of performance characteristics and visual effect.
 - 3. All existing materials, fixtures, and equipment which have been removed or disconnected, but which are not indicated or specified for reuse in new work or called for to be turned over to Owner shall become property of Contractor and shall be removed from site by Contractor at his expense and legally disposed of. On-site storage or sale of salvaged items not designated for Owner reuse will not be permitted.
- B. Debris:
 - 1. Debris shall be placed in approved containers to prevent the spread and accumulation of dust and dirt. Debris shall be removed from the area of work as often as necessary, but not less than at least once at end of each work day. All such debris shall be removed from site by Contractor and legally disposed of.

2. Construction areas, interior and exterior, must be kept in a neat and orderly fashion. Contractor shall interpret "neat and orderly" to be in excess of that which is the normal construction industry practice. Trash, debris and all unusable items must be removed from the site daily. Removal must be supervised.
- C. Protection:
 1. Contractor shall take all necessary precautions to adequately protect personnel and public and private property in the areas of work. Approved barriers and warning signs shall be provided to reroute personnel around areas of dangerous work.
- D. Dust Control:
 1. Dust resulting from removals shall be controlled so as to prevent its spread to occupied portions of the building and to avoid creation of a nuisance in surrounding areas. Existing spaces occupied by Owner's personnel shall be isolated from removal operations by means of temporary dust-tight barriers. Dust seals shall be installed on doors entering spaces of human occupancy. Gaskets or other means may be used provided whatever method is used will not impede the use of these exits in any manner during an emergency.
- E. Access to Site and Buildings:
 1. The premises will be occupied during part of the period of alteration and renovation work. Contractor shall not restrict access to building or site by employees, students, delivery operations, etc. Contractor shall provide covered access to building for protection of the public, employees and for services vehicles, as may be required. Such protection devices shall comply with all governing authorities having jurisdiction.

1.03 DEFINITIONS

- A. "Remove" is hereby defined as the extraction of the item from its position and the disposal of the item as directed in compliance with the specified classifications, and as required by law.
 1. Concrete and masonry shall be removed in small sections and dampened to keep down dust during removal.
 2. Debris resulting from removal operations shall be removed promptly, without accumulation on the site.
 3. After materials and equipment are removed, the structure to remain in place shall be evaluated and the Architect shall be notified of defects uncovered. Repair of such defects and other additional work required by the Architect will be compensated by contract adjustment in accordance with the conditions of the contract.
- B. "Relocate" is hereby classified as any material or equipment removed under this alteration operation, including incidental parts, pieces or attachments, which meets the requirements of the applicable section shall be carefully removed, thoroughly cleaned, and finished as specified in the applicable section of the specifications, then installed as specified for new material.
 1. When procedure of the work prevents the immediate reinstallation of items specified or indicated as "relocate", such items shall be protected, transported and stored until such time as reinstallation is possible. When ready for the reinstallation, remove the items from storage and reinstall in new locations.
 2. In lieu of relocating an existing item, the Contractor may provide a new item, subject to the Architect's approval, and classify the item to be relocated as trash.
- C. "Salvage" is hereby classified as any useful material or equipment that will not be reused as part of the project. Such material shall be dismantled to useful sizes, shapes or components and delivered to the owner on the site, set up or packaged for storage as directed by the Architect or as specified. Large equipment/materials shall be placed on wood skids for ease of handling. Removal of paint, degreasing or cleaning, except that required for normal handling, shall not be a part of this classification. Material and equipment salvaged from the operation shall remain the property of the owner.
- D. "Trash" is hereby classified as all unusable or unsalvageable materials, such as used lumber, broken concrete, masonry, glass, sheet metal, pipe and steel, and shall become the property of the Contractor, be removed as the work progresses, and be legally disposed of off the site.

1.04 SUBMITTALS

A. Schedule:

1. Submit schedule indicating proposed methods and sequence of operations for selective demolition work to the architect for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for duct and noise control protection.

1.05 JOB CONDITIONS

A. Condition of Structures:

1. Owner assumes no responsibility for actual condition of items or structures to be demolished.
2. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.

B. Partial Demolition and Removal:

1. Items indicated to be removed but of salvable value shall be determined by the Owner as to salvage/reuse value.

C. Protection:

1. Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work. Create separations (fire-rated if required) between construction and any occupied areas.
2. Erect temporary covered passageways as required by authorities having jurisdiction.
3. Provide interior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.
4. **Cease operations and notify the Owner/Architect immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.**
5. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
6. Protect floors with suitable coverings when necessary.

D. Damages:

1. Promptly repair damages caused to adjacent facilities by demolition not in this Scope of Work at the Contractor's expense.

E. Explosives:

1. Use of explosives will not be permitted.

F. Utility Services:

1. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
2. Do not interrupt existing utilities serving occupied or otherwise used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

G. Environmental Controls:

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
2. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding and pollution.

PART 2 - EXECUTION2.01. INSPECTION

- A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions to structure surfaces, equipment or to surrounding properties that could be misconstrued as damage resulting from selective demolition work; file with the architect prior to starting work.

2.02. PREPARATION

- A. Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.
- B. Locate, identify, stub off and disconnect utility services that are not indicated to remain.

2.03. DUST PARTITIONS

- A. These are temporary walls to keep dust from entering occupied areas during construction operations. Construct required dust partitions in compliance with UL Design No. U305 and with the following:
 - 1. Pack safing insulation tightly around all conduits, pipes, ducts and other obstructions passing through the partitions.
 - 2. Where partition will be exposed to weather, paint side exposed to the weather.
 - 3. Install fiberglass sill sealer between sole plate and floor, between top plate and ceiling or structural framing system and between studs and abutting vertical surfaces of wall, columns, etc.
- B. Repair and damage to existing work caused by erection and removal of temporary dust partitions. Repair to match adjacent existing surfaces to satisfaction of Architect.

2.04. DEMOLITION

- A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with plans and governing regulations.
 - 1. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
 - 2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
 - 3. For interior slabs or grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
 - 4. Completely fill below grade areas and voids resulting from demolition work. Provide fill consisting of approved earth, gravel or sand, free of trash and debris stones over 6 inches in diameter, roots or other organic matter.
- B. Mechanical, Electrical and Structural Elements:
 - 1. If unanticipated mechanical, electrical or structural elements, which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's representative in written, accurate detail. Pending receipt of directive from the Architect, rearrange selective demolition schedule as necessary to continue overall job progress without delay.
 - 2. Services, equipment and other items required to maintain the normal function of the existing building shall be attached to or supported by temporary substantial supports until new permanent construction is completed for their support or until otherwise directed. Included in this item will be Owner's equipment built into or supported by walls to be removed.

2.05. PATCHING – General Information:

- A. Where removals leave holes or otherwise damaged surfaces that will be exposed in the finished work, these holes and damaged surfaces shall be patched and repaired with materials and by methods which will result in equal or better work than the work being patched, both in performance characteristics and visual affect. Where work is to be applied to existing surfaces, removals and patching shall produce surfaces that are suitable for the provision of the new work. Patching shall be performed by workmen skilled in the trade involved and shall be performed in a neat and workmanlike manner. Finished surfaces of

patched area shall match the existing adjacent surfaces as closely as possible as to texture and finish.

1. **See Section 01045 for additional requirements.**

2.06. SALVAGE MATERIALS

- A. Where indicated on drawings as "salvage" - deliver to Owner. Carefully remove indicated items, clean, store and turn over to Owner at a prescribed location.
- B. The Contractor shall coordinate with the Owner regarding the disposition of any salvageable items remaining in each work area prior to Contractor starting work. Items deemed salvageable by the Owner shall be turned over to the Owner. Items deemed unsalvageable by the Owner shall be legally disposed of off site by the Contractor.

2.07. DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site.
 - 1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws and ordinances concerning removal, handling and protection against exposure or environmental pollution.
 - 2. The burning of removed materials is not permitted on project site.

2.08. RESPONSIBILITY:

- A. The Contractor shall be solely responsible for coordinating demolition with the extent of finished work to avoid the unscheduled removal of any building component.
- B. Unscheduled removal of any building component shall be replaced to previous condition at the Contractor's cost.

2.09. CLEAN-UP AND REPAIR:

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protection and leave interior areas broom clean.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction of surfaces soiled or damaged by selective demolition work.
- C. Remove any temporary work not part of the ongoing Project.

END OF SECTION 02070

SECTION 02200 - EARTH WORK**PART 1 - GENERAL**1.01 **RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General Conditions and Division 1 Specification sections, apply to the work of this section.
- B. This Section may be used as a reference to material required and additionally specified in Section 03300 – Concrete Work.

1.02 **DESCRIPTION OF WORK:**

- A. In General - **Excavate, backfill, compact and grade the site** to the elevations shown on the drawings, as specified herein and/or as necessary to meet the requirements of the construction shown in the Contract Documents.
- B. Work shall include, but not be limited to:
 - 1. General excavation
 - 2. Preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
 - 3. Subbase course for concrete walks and pavements
 - 4. Removal of topsoil and subsoil (as required by balancing the site)
 - 5. Filling and backfilling for new building and structures
 - 6. Drainage and bedding courses for slabs-on-grade
 - 7. Excavating and backfilling for utility trenches
 - 8. Consolidation and compaction
 - 9. Fill for over-excavation
 - 10. Removal of unsuitable and excess material
- C. Aggregate base course(s) under asphaltic and concrete paving – see Sections 02513-Asphalt Concrete Paving and 02514-Portland Cement Concrete Paving for additional information and specifications.

1.03 **RELATED SECTIONS:**

- A. Section 02070 – Demolition and Alteration
- B. See Civil Documents

1.04 **PROJECT CONDITIONS:**

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect or Owner and then only after arranging to provide temporary utility services according to requirements indicated
 - 1. Notify Architect and Owner not less than three (3) calendar days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's or Owner's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

1.05 **DEFINITIONS:**

- A. **Base Course:** material placed over subgrade or sub-grade course and under other surface treatment, often between the sub-base course and the hot-mix asphalt or concrete paving.
- B. **Bedding Course:** material placed over the excavated subgrade or base course in a trench before laying utilities piping, or under a concrete slab or foundation installation.
- C. **Borrow:** Satisfactory/Approved soil from elsewhere on the site or imported from off-site for use as fill or backfill.
- D. **Drainage Course:** material supporting a slab-on-grade that promotes the restriction of upward action of water and moisture, or to allow horizontal movement of ground waters.
- E. **Engineered Fill:** material (**often of a particular characteristic and/or meeting designated criteria**) placed and compacted to densities specified herein, in a controlled manner using lift thickness limited noted herein or industry standards, monitored and tested by the Testing Agency or independent Geotechnical Inspector.

- F. **Excavation:** consists of removal of materials encountered below the topsoil to sub-grade elevations, and subsequent disposal of materials not required on-site.
- G. **Fill/Backfill:** material used to bring existing or construction grades to proposed subgrade. Fill and/or backfill shall normally meet certain material criteria.
- H. **Finish Grade:** final grade elevation indicated on the drawing. Where not specifically noted a uniform slope between spot elevations except where vertical curves or rounding shall be provided at abrupt changes in slope.
- I. **Structures:** Buildings, footings, slabs, curbs, or other man-made stationary features occurring above or below ground surface
- J. **Subgrade:** The bottom of excavation or surface of fill immediately beneath the proposed site improvements, sub-base course, drainage fill or topsoil. If the subgrade has deleterious material, or is found to be a fill material after excavation – immediately inform the owner/architect.
- K. **Sub-base Course:** The compacted granular fill layer between the sub-grade and the Base Course, and/or the pavement base course material. Sub-base material shall be chosen for its compaction and/or stability factors.
- L. **Topsoil excavation:** consists of the stripping of all topsoil as is required for the construction of any improvements on the site, and the subsequent stockpiling and/or disposal of the material – as required.
- M. **Trench:** an excavation where the width is less than twice the depth
- N. **Undercutting:** Necessary excavation of poor quality soils which occur below the existing Topsoil and any uncontrolled materials as described in the Geotechnical Investigation.
- O. **Utilities:** Underground piping, conduits, storm/sanitary structures, etc. carrying infrastructure

1.06 QUALITY ASSURANCE:

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. All material shall be as noted and shall meet MDOT or ASTM standards where required.

1.07 REFERENCES:

- A. **Refer to MDOT 2012 (or current issue) Standard Specifications for Construction Section 902 “Aggregates” for additional information regarding grading and application restrictions.**
- B. AASHTO - M147 - Materials for Aggregate and Soil-Aggregate
- C. AASHTO T180 - Moisture Density Relations of Soils Using a 10 lb Rammer and an 18 in. drop
- D. ASTM C136 - Method for Sieve Analysis of Fine and Coarse Aggregates
- E. ASTM D698 - Test Methods for Moisture Density Relations of Soils and Soil Aggregate Mixtures, Using 5.5 lb Rammer and 12 inch Drop.
- F. ASTM D1556 - Test Method for Density of Soil in Place by the Sand Cone Method
- G. ASTM D1557 - Test Methods for Moisture Density Relations of Soils and Soil Aggregate Mixtures Using 10 lb Rammer and 18 inch Drop.
- H. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
- I. ASTM D2419 - Test Method for Sand Equivalent Value of Soils and Fine Aggregate
- J. ASTM D2434 - Test Method for Permeability of Granular Soils (Constant Head)
- K. ASTM D2487 - Classification of Soils for Engineering Purposes
- L. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- M. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures
- N. ASTM D4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.08 TESTS:

- A. The testing laboratory will make all tests of materials to determine their suitability for compaction and optimum water content, and will supervise continuously the placing of the fill and backfill.

- B. Testing laboratory qualifications: To qualify for acceptance, the geotechnical testing laboratory must demonstrate, to Engineer's satisfaction, based on evaluation of laboratory submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geotechnical testing without delaying the progress of the work.
- C. The representatives of the testing laboratory shall have the power of rejection of materials, equipment or operating procedures, of the filling or backfilling operation. The Contractor shall replace, rework or correct work which does not meet the specifications as directed by the testing laboratory and/or the Landscape Architect/Engineer.

1.09 SUBMITTALS:

- A. Provide Product Data for the following information/material (as applicable per plans):
 - 1. Geotextile materials
 - 2. Material test reports
 - 3. For reuse of existing soils from excavation or re-spreading as topsoil – perform an analysis to confirm acceptability of material for use.
- B. Material Test Reports: Interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.

1.10 PROTECTION OF PERSONS AND PROPERTY:

- A. Barricade open excavations occurring as part of this work with barricade construction approved by governing authorities and with warning lights.
- B. Site Information:
 - 1. Verify that survey benchmark and intended elevations for the work are as indicated.
 - 2. In the case of unsuitable subsoil conditions, notify Architect. A determination of the need for test borings, etc. will then be made.
- C. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- D. Existing utilities:
 - 1. Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.
 - 2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 - 3. Remove from site existing underground utilities indicated to be removed, and interfering with construction. Coordinate with utility companies for shut-off of services if lines are active.
 - 4. Provide minimum 48-hour notice to Engineer, and receive written notice to proceed before interrupting any utility.
- E. Use of Explosives:
 - 1. Use of explosives is prohibited on this project.
 - 2. If conditions are uncovered or arise that require the use of explosives, the Contractor shall notify the Owner and Architect in writing, and obtain Owner approval prior to their use. Do not bring explosives onto site or use in work without prior written permission from all relevant authorities having jurisdiction. Comply with all applicable safety codes. Contractor is solely responsible for handling, storage, and use of explosive materials when their Owner-approved use is permitted.
- F. Protect landscaping and other features remaining as final work.
 - 1. Perform excavation by hand within drip line of large trees designated to remain. To the greatest extent possible, protect root systems from damage or "dry out". Maintain moist condition for root system, and cover exposed roots with moistened burlap.

1.11 PROJECT RECORD DOCUMENTS:

- A. Submit under provisions of Section 01700 Contract Closeout.
- B. Accurately stake, record and maintain all Benchmarks and datum information during the entire construction progress.
- C. Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 - PRODUCTS2.01 ORDINARY, NATIVE FILL:

- A. General: Provide borrow, satisfactory soil materials without additional cost to Owner when sufficient satisfactory soil materials are not available from excavations. Contractor is responsible for doing an independent earthwork calculation and including any import of appropriate fill material required to bring the site to the proposed grades.
- B. **Satisfactory Soil Material** (ASTM D 2487): All material indicated below is subject to review and approval by geotechnical consultant. Material shall be free of stones larger than 2 inches in any dimension, trash, debris, organic material, other objectionable material and classified as follows:
 - 1. Composition: shall be natural, inorganic soil, well graded and free from all frozen, organic, weak, expansive or compressive materials and contain no stones or gravel larger than 2 inches in any dimension.
 - 2. Character of soil shall be such that it can be spread and compacted as specified. On-site material may be used as ordinary fill provided it meets these requirements and is approved by the Architect/Civil Engineer prior to placement. Re-use of any native soils shall be preceded by a soil analysis to confirm the acceptability of the material for the intended use.
 - 3. All cut material shall be relocated on site as fill if the material is appropriate for site balance.
 - 4. Stones larger than four (4) inch diameter are not permitted within two feet of the sub-grade and must be will distributed. Refer to "Finish Grading Specifications" for additional restrictions.
 - 5. Boulders larger than six (6) inch diameter and any other deleterious material shall be removed and disposed of legally off-site.

2.02 GENERAL SOIL MATERIAL REQUIRMENTS:

- A. **Satisfactory** soil materials are defined as those complying with ASTM D-2487 soil classifications groups GW, GP, GM, SW, SP and SM or soils meeting Michigan Department of Transportation (MDOT) Specifications for Class II granular fill.
- B. **Unsatisfactory** soil materials are defined as those complying with ASTM D-2487 soil classifications groups GC, SC, CL, ML, OL, C & H, MH, OH and PT, and not maintained within 2 percent of optimal moisture content.
- C. **Subsoil**: Imported or Excavated material, graded free of lumps larger than 4 inches, rocks large than 2 inches and any debris or deleterious material.
- D. **Backfill and fill materials**. Satisfactory soil materials free of clay, rock or gravel larger than 2 inches in any dimensions, debris, waste, frozen materials, vegetation and other deleterious matter.
- E. **Impervious Fill**: Clayey gravel and sand mixture capable of compacting to a dense state.
- F. **Topsoil**:
 - 2. Reusable excavated or imported friable loam; free of subsoil, roots, grass, and excessive amount of weeds, stones (over 3/4") and foreign matter.
 - 3. Topsoil is defined as those soils with high organic content that are not suitable for backfill because of their low compressive strength characteristics.

2.03 BASE AND SETTING MATERIALS:

- A. Limestone is the normal material for base courses. Blast furnace slag or limestone may be used as fill material in lieu of materials noted when meeting the MDOT classifications and passing the Sieve Analysis of Fine and Course Aggregates - ASTM C136 for the materials and grading required.
- B. **Sub-base Material:**
 - 1. Natural or artificially graded mixture of natural or crushed gravel or stone, blast furnace slag, and natural or crushed sand meeting ASTM 2940.
 - 2. Shall meet MDOT 21AA or 3" x 1", or Class II sand as allowed by the complete material section.

| MDOT 21AA | |
|------------|---------------------|
| Sieve Size | Percentages Passing |
| 2" | 100 |
| 1-1/2" | 100 |
| 3/4" | 80 |
| 3/8" | 50 |
| No. 4 | 35 |
| No. 30 | 15 |
| No. 200 | 0 - 10 |

- C. **Base Course:**
 - 1. Material set on Sub-Base Course or existing sub-surface material to distribute loading for bedding material or structures above.
 - 2. Natural or artificially graded mixture of natural or crushed gravel crushed stone, and natural or crushed sand meeting ASTM 2940.
 - 3. Shall meet MDOT 21AA (noted above), 22A or 6AA.

| MDOT 22A | |
|------------|---------------------|
| Sieve Size | Percentages Passing |
| 2" | 100 |
| 1-1/2" | 100 |
| 1" | 100 |
| 3/4" | 90 - 100 |
| 3/8" | 65 - 85 |
| No. 8 | 30 - 50 |

| MDOT 6AA | |
|------------|---------------------|
| Sieve Size | Percentages Passing |
| 2" | 100 |
| 1-1/2" | 100 |
| 1" | 95 - 100 |
| 1/2" | 30 - 60 |
| No. 4 | 0 - 8 |
| No. 8 | 0 |

- D. **Bedding Course for concrete foundations and slabs:**
 - 1. Natural or artificially graded mixture of natural or crushed gravel crushed stone, and natural or crushed sand meeting ASTM C 33. **Choose** from the following material based on the availability of materials and installation requirements:
 - a. **Large scale foundations** shall meet MDOT 22A for material installations - over 21AA base course that may be required.
 - b. Class II sand for installation over undisturbed base – typical for slab installations.
 - c. MDOT No. 29A is acceptable for typical slab installations.
 - d. MDOT 30A blast furnace slag maximum size of 1/4" meeting ASTM C136 may be used.
 - e. 1/4" x 0 limestone sand
 - 2. Base Material shall be similar to grading characteristics below and meet MDOT and/or ASTM C 33:

| ASTM C33 No. 8 | |
|----------------|---------------------|
| Sieve Size | Percentages Passing |
| 1/2" | 100 |
| 3/8" | 85 - 100 |

| MDOT No. 29A | |
|--------------|---------------------|
| Sieve Size | Percentages Passing |
| 1/2" | 100 |
| 3/8" | 90 - 100 |

| | |
|--------|---------|
| No. 4 | 10 – 30 |
| No. 8 | 0 - 10 |
| No. 16 | 0 – 5 |

| | |
|--------|---------|
| No. 4 | 10 - 30 |
| No. 8 | 0 - 10 |
| No. 16 | 0 |

- E. **Sand** for backfill and to support structural elements:
- MDOT Class II – natural **sand shall be used for compacted and/or engineered back-fill material**. Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials and organic matter, graded in accordance with ANSI/ASTM C136. Class I may be substituted by the Contractor.
 - Blast furnace slag and/or crushed limestone may be used in place of MDOT Class II as long as it meets the sieve analysis of Class II.
 - The percentage composition by weight of Class I, Class II and Class III aggregate sub-bases shall conform to the grading requirements of the following table for the class specified when determined by ASTM C 136:

| ASTM C 136 | | | |
|------------|----------|----------|-----------|
| Sieve Size | Class I | Class II | Class III |
| 3" | 100 | 100 | 100 |
| 2-1/2" | 90 – 100 | 90 – 100 | 90 - 100 |
| No. 4 | 35 – 70 | 40 – 90 | 50 – 100 |
| No. 200 | 0 – 20 | 0 – 25 | 0 - 30 |

2.04 SPECIALIZED FILL AND DRAINAGE MATERIALS:

- A. **Engineered Fill** are materials that meet certain criteria specified by the Documents and may be selected, as appropriate, from the following options:
- Natural or artificially graded mixture of natural or crushed stone, and natural or crushed sand meeting ASTM 2940
 - Shall meet MDOT 21AA (95% Crushed - 3" x 1" sized) or 22A (25% min. crushed - < 3/4" size). Use 22A for best compaction based on interlocking of material.
 - On-site granular deposits within the excavation can be used as engineered fill if approved by the geotechnical engineer and if selective excavation procedures are employed to manage existing clay deposits.** The contractor shall not make assumptions on the availability of on-site deposits being approved by the Testing Agency and/or passing ASTM/MDOT requirements when Bidding and establishing requirements for "site balancing" for the Project.
 - Import fill as required to make-up volumes necessary to raise the building site.
- B. **Drainage Course:**
- Narrowly graded mixture of crushed stone, crushed or uncrushed gravel meeting ASTM D 448. Generally either an MDOT 6A or 34R will meet this requirement.
- C. **Filler Material:** Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel meeting ASTM D 448 and as noted below. The contractor shall have the option to choose from the following graded material as the particular installation warrants:
- Large, course-aggregate grading size #24 (sieve size between 3/4" and 2-1/2") with 90% passing 2-1/2" sieve.
 - Course-aggregate grading size #57 (sieve size between 3/16" and 1") with 95% passing 1" sieve.
 - Shall meet MDOT 34R – pea gravel, for drainable, bedding material at foundations and strip footings.
 - Class II sand for 95% compaction requirements.
- D. Pea Gravel: Natural stone; washed, free of clay, shale, organic matter, graded in accordance with ANSI/ASTM C136:
- Minimum Size: 1/8" inch, Maximum Size: 1/2" inch.
 - Shall meet MDOT 34R or MDOT #7 (sieve size between 3/16" and 1/2") for use as setting or drainage bed.
- E. Sand for various uses:

1. MDOT 2NS sand (washed sand) shall only be used for an open, bedding or drainage material since it will not achieve proper compaction. Use for final bedding for pavers or top dressing along drip-line, etc.
2. MDOT Class II – natural sand shall be used for compacted and engineered back-fill material. Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials and organic matter, graded in accordance with ANSI/ASTM C136.
3. Blast furnace slag and/or crushed limestone may be used in place of MDOT Class II as long as it meets the sieve analysis of Class II.

PART 3 – EXECUTION

3.01 BASIS OF CONTRACT:

- A. Extent of work shall be that necessary to cut and/or fill to obtain the cross-Sections and elevations indicated or required on the plans.
- B. Examine the areas and conditions under which excavating filling and grading are to be performed and notify the Consultant, in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.
- C. Identify required lines, levels, contours and datum.
- D. Maintain and protect existing construction and utilities to remain.
- E. **Verify foundation or basement walls are adequately braced to support surcharge of lateral forces imposed by backfilling operations.**

3.02 PROTECTION OF PERSONS AND PROPERTY:

- A. Barricade open excavations occurring as part of this work with barricade construction approved by governing authorities and with warning lights.
- B. Site Information:
 1. Verify that survey benchmark and intended elevations for the work are as indicated.
 2. In the case of unsuitable subsoil conditions, notify Architect. A determination of the need for test borings, etc. will then be made.
- C. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
- D. Existing utilities:
 1. Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.
 2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
 3. Remove from site existing underground utilities indicated to be removed and interfering with construction. Coordinate with utility companies for shut-off of services if lines are active.
 4. Provide minimum 48-hour notice to Engineer, and receive written notice to proceed before interrupting any utility.
- E. Use of Explosives:
 1. Use of explosives is prohibited on this project.
 2. If conditions are uncovered or arise that require the use of explosives, the Contractor shall notify the Owner and Architect in writing, and obtain Owner approval prior to their use. Do not bring explosives onto site or use in work without prior written permission from all relevant authorities having jurisdiction. Comply with all applicable safety codes. Contractor is solely responsible for handling, storage, and use of explosive materials when their Owner-approved use is permitted.
- F. Protect landscaping and other features remaining as final work.

1. Perform excavation by hand within drip line of large trees designated to remain. To the greatest extent possible, protect root systems from damage or "dry out". Maintain moist condition for root system, and cover exposed roots with moistened burlap.

3.03 PROTECTION OF ADJACENT WORK

- A. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.
- B. Grade excavation top perimeter to prevent surface water run-off into excavation or to adjacent properties.

The following sections are separated into 3 parts: 3A – Excavation; 3B – Setting of Aggregate Material and Backfilling; 3C – Grading and Schedules.

PART 3A – EXCAVATION

3A.01 GENERAL EXCAVATION:

- A. Method shall be open cut or tunneling/boring where desirable for the protection of neighboring surfaces, structures, plants, workmen, and or the public.
- B. Extent shall be as required for the proposed structures allowing ample room for construction (form work, dewatering, etc.) and inspection.
- C. Tolerance shall be within 0.10' of the proposed subgrade.
- D. Subgrade Preparation: bottom of excavation for slabs, foundations, etc. shall be cleaned, trimmed and leveled as required for the installation immediately prior to placement of base or foundation.
- E. Excess Excavation or disturbed subgrade that requires excavation beyond the prescribed limits shall be replaced with Granular Backfill or 2,000 psi Concrete at the discretion of the Consultant. All replacement shall be at the Contractor's expense.
- F. Inspection of the subgrades by the Consultant shall take place prior to placement of any base or structure. The Contractor shall provide proper advance notification.
- G. Excavated Material shall be stockpiled as directed by Consultant. Excess excavated material shall be disposed of on-site as directed by Consultant.
- H. Protect excavation for footings against freezing when atmospheric temperature is less than 35 degrees F.

3A.02 DEWATERING

- A. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area. This work shall be performed in accordance with the requirements of all soil erosion and sedimentation control agencies.
 1. Do not allow water to accumulate in excavations. Remove water to prevent soil changes detrimental to stability of sub-grades. Provide and maintain pumps, well points, sumps, suction, and discharge lines and other dewatering system components necessary to convey water away from excavations.
 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.
- B. The Contractor shall remove all water that accumulates in any excavation. The Contractor is responsible for any cost of dewatering, maintaining the dewatering until the structure can be placed and any damage caused by the dewatering process.

3A.03 STABILITY OF EXCAVATIONS:

- A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
- B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

3A.04 PREPARATION:

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect utilities that remain, from damage.
- D. Notify local utility company to locate and identify all utilities.
- E. Protect above and below grade utilities that remain.
- F. Protect plant life, lawns, [natural features to remain - rock outcropping] and other features remaining as a portion of final landscaping.
- G. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- H. Cut out soft areas of subsoil not readily capable of compaction. Backfill with subsoil and compact to density equal to requirements for subsequent backfill material.
- I. Prior to placement of aggregate base course material, verify and/or compact subsoil to 95% of its maximum dry density in accordance with ANSI/ASTM D698, D2167 or D2922.

3A.05 SUBSOIL EXCAVATION:

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Excavate wet subsoil and process wet material to obtain optimum moisture content.
- C. When excavating through roots, perform work by hand and cut roots with sharp axe.
- D. Stockpile in area designated on site to depth not exceeding [8] feet and protect from erosion for redistribution on the site.
- E. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key placed fill material to slope to provide firm bearing.
- F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3A.06 TOPSOIL EXCAVATION:

- A. Excavate topsoil from areas to be further excavated or re-graded and stockpile in area as directed by Landscape Architect/Engineer.
- B. Do not excavate wet topsoil.
- C. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
- D. Dispose of excess excavated soil material, excess topsoil, and materials not acceptable for use as backfill or fill of site at no additional cost to Owner.
- E. Stockpile topsoil to depth not exceeding 8 feet. Seed to protect from erosion if needed.
- F. Restore stockpile area to situation prior to use, or to match adjacent areas at the direction of the owner.

3A.07 SUBGRADE PREPARATION AND INSPECTIONS:

- A. Perform mass earthwork operations to remove all existing topsoil and other organic materials in their entirety within the footprint of the proposed building and pavement areas. Buried objects should be removed in their entirety.
- B. Notify Testing Agency when excavations have reached required subgrade elevations.
- C. Proof-roll subgrade in the presence of the Testing Agency to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction repeating proof-rolling in direction perpendicular to the first direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll subgrade with heavy pneumatic-tired equipment or loaded 10-wheel, tandem-axle truck weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by the Testing Agency, and replace with engineered fill as directed.

3A.08 TRENCHING

- A. Coordinate with Section 02225 – Trenching for additional information.
- B. Excavate for utilities as required.
- C. Cut trenches sufficiently wide to enable installation of utilities and allow inspection.

- D. Hand trim excavation and leave free of loose matter.
- E. Support pipe and conduit during placement and compaction of bedding fill.
- F. Backfill trenches to required contours and elevations.
- G. Place and compact fill materials as for Backfilling.

3A.09 EXCAVATION FOR UTILITY LINES:

- A. Depth shall allow for pipe bedding. Hand trim excavation where required. Hand trim for bell and spigot pipe joints. Remove loose matter.
- B. Width shall be wider and deeper at each joint to provide for properly completing the pipe joint and relieve the joint of all loadings. Width at the pipe shall provide a maximum clearance of 12 inches and minimum clearance of 6 inches on each side of the pipe. Width at top of excavation shall be as narrow as practicable.
- C. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd, measured by volume.
- D. Sheet piling/bracing shall be used where the trench is in close proximity to existing structures or the ground conditions require. Remove sheet piling/bracing as backfilling progresses. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing down as excavation progresses. Provide materials for shoring and bracing in good serviceable condition.
- E. Exposed existing utilities shall be adequately supported during operations and given a permanent support meeting the utility Owner or agency's standards and such that they will not be damaged by later settlement. Any damage to existing utilities shall be repaired at the Contractor's expense to the requirements of the utility-owner's or agency's satisfaction.

3A.10 UNSUITABLE BEARING MATERIALS:

- A. Definition: Material inside building lines, under exterior walls, steps, paved areas, foundations, structures, etc. of the following characteristics:
 - 1. Topsoil and loam.
 - 2. Peat, organic soil, sod, wood, roots or other matter subject to decay.
 - 3. Soft, spongy or compressible soil.
- B. Removal of all unsuitable materials shall take place prior to construction. If unsuitable material is encountered at the required sub-grade elevation, the Contractor shall remove the unsuitable material and replace with Granular Backfill up to one additional foot at no added cost. If further excavation and backfill is required and approved by the Consultant, the Contractor will be paid on the basis of informative prices in the proposal form.

3A.11 APPROVAL OF SUBGRADE:

- A. Notify the Testing Agency when required elevations have been reached.
- B. When required by the architect due to the unforeseen presence of unsatisfactory materials or other factors, perform additional excavation and replace with approved compacted fill material in accordance with the architect's or geotechnical engineer's instructions.
- C. Payment for unforeseen additional work will be made in accordance with established unit prices or, if none, in accordance with provisions for changes in the work. No payment will be made for correction of subgrades improperly protected against damage from freeze-thaw or accumulation of water, or for correction of otherwise defective subgrades.

PART 3B – SETTING OF AGGREGATE MATERIAL AND BACKFILLING

3B.01 GENERAL FILLING AND BACKFILLING:

- A. Preparations:
 - 1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip, or brake up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

2. When existing ground surface has density less than that specified under "Compaction" for particular area's classification, break up ground surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.
3. Remove all form work, debris and other deleterious material unless otherwise specified.
- B. Filling over rubble:
 1. It is the responsibility of the Contractor to completely choke all voids in such a manner as to stop all infiltration of fill placed above rubble, if approval to place fill over rubble is given by the Consultant.
- C. Subgrade must be dry and compacted to insure that it shall have adequate density to support subsequent fill without undue settlement.
- D. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers. Each layer shall meet the following maximum unit densities in accordance with ASTM D-1557:
 1. Ordinary Fill 90% Aggregate Base and Granular Fill/Base/Sub base 95%
- E. No Filling shall take place in unfavorable weather as determined by the Consultant.
- F. Maintain subgrades at levels specified until scheduled for subsequent construction. Correct all settlement occurring after required rough grades are obtained, and any later damage resulting there from.
- G. Moisture Control:
 1. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3B.02 SUBBASE AND BASE COURSES:

- A. If indicated on the plans or deemed necessary by the geotechnical engineer, install separation fabric on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
- B. Under pavements and walks, place subbase course on separation fabric according to fabric manufacturer's written instructions if fabric is called for on the plan or deemed necessary by the geotechnical engineer.
- C. Under pavements and walks, place base on prepared subbase or subgrade as follows:
 1. Place base course material over subbase (or subgrade if subbase is not indicated).
 2. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557
 3. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted
- D. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layers to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3B.03 BACKFILLING UNDER VARIOUS STRUCTURES:

- A. Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. If soil density tests indicate inadequate compaction, correct improperly compacted areas or lifts as directed by Engineer.

- B. Percentage of maximum density requirements for compact sand - not less than the following percentages of maximum, density, in accordance with the Standard Proctor Test, ASTM D 698 and ASTM D 1557, or the Michigan Cone Test:
 - 1. Under structures, slabs, compact top 12 inches of sub-grade and each layer of backfill of fill material at 95 percent maximum density.
 - 2. Under Buildings: place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
 - a. Backfill against supported foundation walls.
 - b. Do not backfill against unsupported foundation walls.
 - c. Employ a placement method that does not disturb or damage foundation perimeter drainage
 - 3. Under lawn or unpaved areas, compact top 6 inches of sub-grade and each layer of backfill or fill material at 90 percent maximum density.
 - 4. Under walkways, compact top 6 inches of sub-grade and each layer of backfill or fill material at 95 percent maximum density.
 - a. Percentage of maximum density requirements for compact gravel - not less than the following percentages of maximum density, in accordance with the Standard Proctor Test, ASTM D 698 or the Michigan Cone Test.
 - 5. Under pavements, compact top 6 inches of base and each layer of backfill of material at 98 percent maximum density.
- C. Place acceptable soil material in layers to required subgrade elevations, for each area classification listed below:
 - 1. Under topsoil at grassed or planted area, use satisfactory ordinary fill material to 6 below finish grade.
 - 2. Under slabs, walks and pavements: Use Base Course or granular fill material.
- D. Backfill excavations as promptly as work permits, but not until the completion of the following:
 - 1. Review by Consultant of construction below finished grade.
 - 2. Inspection, testing, approval and recording locations of underground utilities.
 - 3. Removal of trash and debris.

3B.04 BACKFILLING FOR UTILITY LINES:

- A. Backfill only after pipes have been inspected, tested and locations of pipes and appurtenances have been recorded.
- B. Backfill trenches to contours and elevations. Backfill systematically, as early as possible, to allow maximum time for natural settlement.
- C. Do not backfill over porous, wet or spongy sub-grade surfaces. Maintain optimum moisture content of backfill materials to attain required compaction density, 95% modified proctor density ASTM D1557 within the zone of influence for all buildings and pavement, 90% modified proctor density ASTM D1557 under lawn areas
- D. Support pipe during placement and compaction of Class II bedding fill.
- E. Place by hand Granular Backfill to a depth of one foot above the pipe. Tamp firmly in layers not exceeding six inches, taking care not to disturb the pipe.
- F. Under Pavements, structures, etc. use Granular Backfill as described under General Filling and Backfilling of this Section.
- G. Other Areas use Ordinary Backfill as described under General Filling and Backfilling of this Section.

PART 3C – GRADING AND SCHEDULES:

3C.01 GRADING:

- A. General: uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

- B. Grading outside building lines: grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:
 - 1. Walks: shape surface of areas under walks to line, grade, and cross-section, with finish surface not more than 0.10 foot above or below required sub-grade elevation.
- C. Subsurface installations: grade to allow for installation of compactable material forming base for concrete or other structures.
- D. Compaction: after grading, compact sub-grade surfaces in areas to be paved to the depth and indicated percentages of maximum or relative density for each area classification.
 - 1. Extent shall be areas within limits of work indicated on the plans including any adjacent transition areas.
 - 2. Tolerance within 0.10' of the proposed subgrade
 - 3. Degree of Finish shall be that which is ordinarily obtainable from a blade-grader or dozer back-blade operations.
- E. Uniformity: Contractor shall finish all grading surfaces within specified tolerance providing uniform slopes between given elevations and rounding land forms as directed by Consultant.
- F. Review of subgrade land form contour by Consultant is required prior to placement of topsoil or any structures.
- G. Minor Changes as directed by Consultant shall be at no extra cost to the Owner.
- H. Correction of subgrade is required wherever settlement, erosion or other grade changes have occurred.

3C.02 DISPOSAL OF SURPLUS AND WASTE MATERIALS:

- A. Disposal: Unless otherwise indicated on the drawings, remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.
 - 1. Do not burn materials on the Owner's property

3C.03 MAINTENANCE AND GUARANTEE:

- A. Protection of graded areas. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning compacted areas. Where completed areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.
- D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement or other finish), add backfill material, compact and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.
- E. Settlement within a one-year period after final acceptance shall be brought to proper grade by the Contractor at no expense to the Owner. Any surface features (i.e. pavements, structures, etc.) disturbed or damaged by settlement shall be repaired or replaced as determined by the Consultant at no expense to the Owner.

3C.04 SCHEDULE:

- A. Interior Slab-On-Grade profile – typical minimum unless noted otherwise in the Documents:
 - 1. Class II sand, compacted to 4 inches minimum thickness, compacted to 95% with vapor barrier as indicated on Documents.
 - 2. Additional Class II sand cover of 2 inches compacted to 95% on engineered fill or undisturbed sub-soils.
- B. Interior side of Foundation Walls, Retaining Walls and Over Granular Filter Material:
 - 1. See Section 02200. 2.04 – Fill and Drainage Materials for various materials suitable for this type of installation.
 - 2. Coordinate with Documents and interior construction for suitable material in this application including optional drainage course if noted.

3. Typical material shall be MDOT 21AA or Class II sand compacted to 95% density.
- C. Under interior concrete strip or pier footings:
 1. See Section 02200. 2.04 – Fill and Drainage Materials for various materials suitable for this type of installation
 2. Typical material shall be MDOT 21AA or Class II sand compacted to 95% density.
- D. Exterior strip footing and foundation wall bearing:
 1. Bed Course material or Class II sand compacted to 95%
 2. Choose material that will compact and provide a stable, interlocked base.
 3. Provide suitable depth over sub-base to provide stable bedding without deleterious moisture.
- E. Exterior concrete profile – typical minimum unless noted otherwise in the Documents:
 1. Class II sand, compacted to 4 inches minimum thickness, compacted to 95%.
- F. Exterior side of Foundation Walls, Retaining Walls and Over Granular Filter Material:
 1. See Section 02200. 2.04 – Fill and Drainage Materials for various materials suitable for this type of installation.

END OF SECTION 02200

SECTION 02215 – SOIL EROSION AND SEDIMENTATION CONTROL**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes conducting earthwork and earth change activity operations in a manner to protect Waters of the State (of Michigan), storm drains, and adjacent properties from soil erosion and sedimentation.

1.3 DEFINITIONS

- A. "Waters of the State" includes the Great Lakes and their connecting waters, lakes, ponds and streams which may or may not be serving as a County drain as defined by the drain code; or any other body of water that has definite banks, a bed and visible evidence of a continued flow or continued occurrence of water or wetlands regulated under Part 303.

1.4 SUBMITTALS

- A. Submit product information for materials proposed for use.

1.5 PERFORMANCE REQUIREMENTS

- A. Control runoff, soil erosion, and sedimentation. No sediment should leave the site.
- B. Prevent wind erosion. No visible emissions (dust) should leave the site.
- C. Comply with City of Ann Arbor Soil Erosion and Sedimentation Control Procedures.

PART 2 - MATERIALS (NOT APPLICABLE)**PART 3 - EXECUTION****3.1 PREPARATION**

- A. Where the following events result in the need for additional or modified soil erosion and sedimentation control installations to meet the objective of the referenced procedures, provide remedial installations on a timely basis.
 - 1. Unanticipated alterations to the construction schedule.
 - 2. Unanticipated site conditions except Acts of God such as a tornado or fire.
- B. Install temporary erosion and sedimentation control measures prior to or upon commencement to earthwork activities.
 - 1. Install and entrance anti-tracking pad with a minimum of 50 feet in length. A geotextile filter fabric should be placed under six inches of limestone aggregate.
 - 2. Install temporary inlet protection at all adjacent and down-gradient storm water inlets, catch basins and manholes that may be impacted.

3. Install silt fence with stakes on the side down gradient from the disturbed area. Toe in six inches of the fencing material.
 4. Place stockpiles and other spoil piles away from the drainage system to minimize sediment transport. Keep as few stockpiles as possible during the course of the project. If the stockpile and/or spoil pile must remain on-site overnight, or if the weather conditions indicate the chance for precipitation,
 - a. Cover the pile with water repellent material to prevent erosion, or
 - b. Install silt fencing around the base of the pile to prevent transport of sediment to the storm water system and wet the pile as needed to prevent wind erosion, or
 - c. Apply other control methods as appropriate to the site.
 5. Where runoff enters the existing storm water system, protect the storm system from sedimentation.
 - a. Temporary inlet protection must prevent the release of sediment and allow for proper drainage.
 - 1) Use of burlap is not acceptable as a SESC measure.
 - 2) Use silt sacks in lieu of filter fabric for drain protection. Based on site conditions select regular or high flow silt sacks as appropriate.
- C. Utilize a water truck as needed for dust control.
- D. Utilize a sweeping machine to remove sediment tracked onto the pavement on a daily basis at minimum. Use sweeper more frequently as dictated by site conditions.
- E. Maintain erosion and sedimentation controls on a daily basis until the contract has been completed and accepted. Maintenance shall include:
1. Repair of damaged installations.
 2. Replacement of lost soil erosion and sedimentation control measures.
 3. Periodic removal of collected silt and sedimentation as required or directed to maintain effectiveness of the silt traps, filters and basins.
- F. Correct non-conforming soil erosion and sedimentation control worn on a timely basis within 24 hours, if Waters of the State are being impacted or within five days if not impacting Waters of the State.
- G. Complete permanent soil erosion control measures for all slopes, channels, ditches, or any disturbed land area within five calendar days after final grading or the final earth change has been completed. Maintain temporary control measures until permanent soil erosion control measures are in place and the area is stabilized.

3.2 CLEAN UP

- A. Remove temporary erosion control measures after permanent soil erosion measures are in place and the area is stabilized, unless ordered by the Owner's Representative to remain in place. Care shall be taken during removal to prevent soil erosion and sedimentation.

END OF SECTION 02215

SECTION 02230 - SITE CLEARING**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes the following:
1. Protecting existing trees, shrubs, groundcovers, plants, and grass to remain.
 2. Removing existing trees, shrubs, groundcovers, plants, and grass.
 3. Clearing and grubbing.
 4. Stripping and stockpiling topsoil.
 5. Removing above- and below-grade site improvements.
 6. Disconnecting, capping or sealing, and removing site utilities.
 7. Temporary erosion and sedimentation control measures.
- B. Related Sections include the following:
1. Division 1 Section "Execution Requirements" for verifying utility locations and for recording field measurements.
 2. Division 1 Section "Selective Demolition" for partial demolition of buildings or structures undergoing alterations.
 3. Division 2 Section "Building Demolition" for demolition of buildings, structures, and site improvements.
 4. Division 2 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.
 5. Division 2 Section "Soil Erosion and Sedimentation Control" for preventing soil erosion and controlling sediment.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Record drawings, according to Division 1 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the City of Ann Arbor Soil Erosion & Sedimentation Control Procedures.
- B. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established and as required by site inspections by the City of Ann Arbor.
- C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
 1. Do not store construction materials, debris, or excavated material within fenced area.
 2. Do not permit vehicles, equipment, or foot traffic within fenced area.
 3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
 1. Cover exposed roots with burlap and water regularly.
 2. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
 4. Backfill with soil as soon as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

3.4 UTILITIES

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 1. Arrange with utility companies to shut off indicated utilities.
 2. Owner will arrange to shut off indicated utilities when requested by Contractor.

- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than 2 days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.
- D. Excavate for and remove underground utilities indicated to be removed.
- E. Removal of underground utilities is included in Division 2 Sections covering site utilities.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
 - 4. Use only hand methods for grubbing within tree protection zone.
 - 5. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

3.7 SITE IMPROVEMENTS

- A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.8 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
 - 1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to disposal/recycling facilities.

END OF SECTION 02230

SECTION 02300 - EARTHWORK**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes the following:
1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and grasses, and exterior plants.
 2. Excavating and backfilling for buildings and structures.
 3. Drainage course for slabs-on-grade.
 4. Subbase course for concrete walks and pavements.
 5. Subsurface drainage backfill for walls and trenches.
 6. Excavating and backfilling for utility trenches.
 7. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
- B. Related Sections include the following:
1. Division 1 Section "Allowances" for quantity allowance provisions related to unit-price rock excavation and authorized additional excavation.
 2. Division 1 Section "Unit Prices" for unit-price rock excavation and authorized additional excavation provisions.
 3. Division 1 Section "Construction Progress Documentation" for recording preexcavation and earthwork progress.
 4. Division 1 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities.
 5. Section 02230 "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping topsoil, and removal of above- and below-grade improvements and utilities.

1.3 UNIT PRICES

- A. Unit prices for earthwork are included in Division 1 Section "Unit Prices."
- B. Quantity allowances for earthwork are included in Division 1 Section "Allowances."
- C. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following. Unit prices for rock excavation include replacement with approved materials.
1. 24 inches outside of concrete forms other than at footings.
 2. 12 inches outside of concrete forms at footings.
 3. 6 inches outside of minimum required dimensions of concrete cast against grade.
 4. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 5. 6 inches beneath bottom of concrete slabs-on-grade.
 6. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Granular Course: Course supporting the slab-on-grade.
- G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
 - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- H. Fill: Soil materials used to raise existing grades.
- I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - 1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lbf and stick-crowd force of not less than 18,650 lbf; measured according to SAE J-1179.
 - 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- J. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.
- K. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

- L. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- M. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- N. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.
- O. Required Compaction: The ratio of in-place density to maximum density, expressed as a percentage.
- P. Compacted: Material at the required compaction or higher.
- Q. Maximum Density: The dry density at optimum moisture content in accordance with ASTM D1557 (Modified Proctor).

1.5 SUBMITTALS

- A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 1557 for each on-site and borrow soil material proposed for fill and backfill.
- B. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.6 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction.
 - 1. Comply with State of Michigan, Department of Transportation (MDOT), 2003 Standard Specifications for Construction.
- B. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.
- C. Preexcavation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify Architect not less than 2 days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.

3. Contact utility-locator service for area where Project is located before excavating.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: [ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM] [AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3], or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups [GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487] [A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145], or a combination of these groups.
 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone and natural or crushed sand complying with MDOT Table 902-2 for 21AA Dense Graded Aggregate.
- F. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone and natural or crushed sand complying with MDOT Table 902-2 for 21AA Dense Graded Aggregate.
- H. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- I. Engineered Fill: Granular soil material complying with MDOT Table 902-3 for Class II Granular Material.
- J. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- K. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

- L. Granular Course: Granular soil material complying with MDOT Table 902-3 for Class II Granular Material.
- M. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- N. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.
- O. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.
- P. Pea Gravel: Clean, hard, durable, free flowing, naturally rounded particles of rock, free from clay lumps, with 100% passing a 3/8" sieve and not over 5% passing a #8 sieve.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section 02230 Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Section 02230 Site Clearing," during earthwork operations.
- D. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- E. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.
- C. If ground water and/or surface water is encountered in quantities that require dewatering, contact the Architect for further direction.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

- A. **Unclassified Excavation:** Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs on grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.
- B. **Classified Excavation:** Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract time may be authorized for rock excavation.
1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
 2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs on grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.
- C. **Disposal:** Topsoil and other excavated soils shall not be reused. Excavated soils shall be disposed of at the Veolia – Arbor Hills Landfill in Northville, Michigan as contaminated, non-hazardous material.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 - 3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
 - 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.8 SUBGRADE INSPECTION

- A. Notify Architect when excavations have reached required subgrade.

- B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. After stripping of topsoil and other surface organic matter and before further excavation, proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- D. Topsoil and other excavated soils may be reused. Spoil soils shall be disposed of off-site.
- E. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
 - 4. Special care shall be exercised when proofrolling adjacent to the existing building to minimize disturbance to existing footings and floor slabs.
 - a. Use light proofrolling equipment for a strip approximately ten (10) feet wide along the existing building.
 - 5. Proof-rolling operations must be done in presence of Testing Agency.
- F. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
- G. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 3 Section "Cast-in-Place Concrete."
- D. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- E. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the utility pipe or conduit.
- F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- G. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- H. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

3.13 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
1. Under grass and planted areas, use satisfactory soil material.
 2. Under walks and pavements, use satisfactory soil material.
 3. Under steps and ramps, use engineered fill.
 4. Under building slabs, use engineered fill.
 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
 - 4. For utility trenches, compact each layer of initial and final backfill soil material at 98 percent.

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBBASE AND BASE COURSES

- A. Place subbase course on subgrades free of mud, frost, snow, or ice.

- B. On prepared subgrade, place subbase course under pavements and walks as follows:
1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 2. Place base course material over subbase course under hot-mix asphalt pavement.
 3. Shape subbase course to required crown elevations and cross-slope grades.
 4. Place subbase course 6 inches or less in compacted thickness in a single layer.
 5. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 6. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.18 GRANULAR FILL COURSE

- A. Place granular fill course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact granular fill course under cast-in-place concrete slabs-on-grade as follows:
1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 2. Place granular fill course 6 inches or less in compacted thickness in a single layer.
 3. Place granular fill course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 4. Compact each layer of granular fill course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.19 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.
 2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for each 100 feet or less of wall length, but no fewer than 2 tests.
 3. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but no fewer than 2 tests.

- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

SECTION 02630 - STORM DRAINAGE**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes gravity-flow, nonpressure storm drainage outside the building, with the following components:
 - 1. Cleanouts.
 - 2. Retention basins and inlets.

1.3 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-foot head of water. Pipe joints shall be at least silttight, unless otherwise indicated.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Pipe and fittings.
- B. Shop Drawings: For the following:
 - 1. Catch Basins and Stormwater Inlets. Include plans, elevations, sections, details, and frames, covers, and grates Catch Basins and Stormwater Inlets. Include plans, elevations, sections, details, and frames, covers, and grates.
- C. Field quality-control test reports.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.
- D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
1. Notify Architect no fewer than 2 days in advance of proposed interruption of service.
 2. Do not proceed with interruption of service without Architect's written permission.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PVC PIPE AND FITTINGS

- A. PVC Sewer Pipe and Fittings, 6-inch and Smaller: ASTM D3034, SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F477, elastomeric seals.

2.3 CATCH BASINS AND INLETS

- A. Standard Precast Concrete Catch Basins: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
 2. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
 3. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 4. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
 5. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
 6. Grade Rings: Include 2 or 3 reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and grate.
 7. Steps: Individual FRP steps wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
 8. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- B. Frames and Grates: per plans.

PART 3 - EXECUTION**3.1 EARTHWORK**

- A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
 - 1. Install piping pitched down in direction of flow, at indicated slope.

3.3 PIPE JOINT CONSTRUCTION

- A. Basic pipe joint construction shall follow piping manufacturer's written instructions.
- B. Join dissimilar pipe materials with pressure-type couplings.

3.4 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.5 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- 1. Abandoned Manholes and Structures: Excavate around manholes and structures as required and remove manhole or structure and remaining piping.
- B. Backfill to grade according to Division 2 Section "Earthwork."

3.6 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate report for each test.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.
- 3.7 CLEANING**
- A. Clean interior of piping of dirt and superfluous materials.

END OF SECTION 02630

SECTION 02751 - CEMENT CONCRETE FLATWORK**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes exterior cement concrete flatwork for the following:
 - 1. Curbs and gutters.
 - 2. Walkways.
- B. Related Sections include the following:
 - 1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Delete paragraph below if no exposed-aggregate finish.
- C. Qualification Data: For testing agency.
- D. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing compounds.
 - 6. Applied finish materials.
 - 7. Bonding agent or epoxy adhesive.
 - 8. Joint fillers.
- E. Field quality-control test reports.
- F. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
 - 1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete producer.
 - d. Concrete pavement subcontractor.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.
 - 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for curves with a radius 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
 - 1. Portland cement shall be Type I, Grade P-1, conforming to MDOT Sec. 8.01.
 - 2. Hydrated lime shall conform to MDOT Sec. 8.01.

- B. Aggregates & Soil Materials:
 - 1. Course concrete aggregates shall be 6A or 6AA limestone conforming to MDOT Sec. 8.02.
 - 2. Fine concrete aggregates shall be 2NS conforming to MDOT Sec. 8.02.
 - 3. Dense-graded aggregates shall be MDOT Series 21, 22, or 23, as specified, conforming to MDOT Sec. 8.02, except that aggregate base courses for road construction shall be either natural aggregate or crushed limestone, and the maximum limit for loss by washing shall be 8.0%.
 - 4. Crushed concrete in not an acceptable aggregate.

- C. Water: ASTM C 94/C 94M.

- D. Air-Entraining Admixture: ASTM C 260.

2.4 CURING MATERIALS

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

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.6 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 4000 psi.
 - 2. Maximum Slump Limit: 4 inches.

- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement within range of 4 to 7 percent.

- D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing 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.

2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 deg F 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.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For concrete mixes of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For concrete mixes larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
 - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll and compact prepared subbase surface below concrete to identify soft pockets and areas of excess yielding.
 - 1. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Division 2 Section "Earthwork."
- C. Proceed with concrete operations only after nonconforming conditions have been corrected and subgrade is ready to receive concrete.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

B. Expansion Joints:

1. For unsealed joints, install the expansion joint filler strip 1/8 inch below the finish surface of the walk.
2. For sealed joints, install expansion joint filler strips in a manner to provide a void having depth equal to width of joint plus 1/8 inch for sealing compound.
3. Provide 1/2-inch-thick expansion joints at points of contact with fixed objects such as building, curbs, pavement, poles, signs and hydrants, at intervals not exceeding 30 feet, or as indicated.
4. With handicapped ramps to front doors, check to ensure door threshold will not be resting on walk pavement. If this occurs, provide detail for extra expansion joint under threshold.

C. Control Joints:

1. Provide control joints in concrete walks to form panels of sizes indicated, located at right angles to, and parallel to, building lines or to patterns indicated on Drawings.
2. Control joint size: 1/4 inch wide by approximately one-fifth the depth of walk.
3. Form control joints in walks by tooling or by inserting a pre-molded or metal strip finished flush with surface when concrete is placed. After the concrete has cured for a period of not less than one week, remove inserts and clean joints. Joints may be formed by sawing as soon as the concrete has hardened sufficiently to prevent raveling of the concrete at edges.

- D. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site.
- F. Do not add water to fresh concrete after testing.
- G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms.

Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

- I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
 1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.
- J. Screed pavement surfaces with a straightedge and strike off.
- K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- L. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
- M. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.
 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- N. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- O. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 2. Do not use frozen materials or materials containing ice or snow.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- P. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
- C. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to 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 concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 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. 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.

3.8 TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 - 1. Elevation: 1/4 inch.
 - 2. Thickness: 1/4 inch.
 - 3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/4 inch.
 - 4. Joint Spacing: 1 inch.

5. Contraction Joint Depth: Plus 1/4 inch, no minus.
6. Joint Width: Plus 1/8 inch, no minus.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 CONCRETE WASHOUT

- A. Do not discharge concrete washout into storm drains, catch basins or to the sanitary sewer system. Perform washing of concrete trucks in designated areas or offsite.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751

SECTION 02934 - SODDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.2 DESCRIPTION OF WORK:

- A. Extent of sodded lawns is shown on drawings and by provisions of this Section.

- B. Types of work required include the following:

- 1. Soil preparation
- 2. Sodding lawns

- C. Related work specified elsewhere:

- 1. Section 02940: Native Plugs
- 2. Section 02950: Herbaceous Plants
- 3. Section 02970: Landscape Maintenance and Warranty Standards

1.3 QUALITY ASSURANCE:

- A. Sod: Comply with American Sod Producers Association (ASPA) classes of sod materials.

1.4 SUBMITTALS:

- A. Submit sod growers certification of grass species including special shade grown species. Identify source location.

- B. Manufacturer's certification of fertilizer.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Cut, deliver and install sod within 24 hour period.

- B. Do not harvest or transport sod when moisture content may adversely affect sod survival.

- C. Protect sod from sun, wind and dehydration prior to installation. Do not tear, stretch or drop sod during handling and installation.

1.6 PROJECT CONDITIONS:

- A. Work notifications: Notify Landscape Architect at least 7 working days prior to start of sodding operation.

- B. Protect existing utilities, paving and other facilities from damage caused by sodding operations.

- C. Perform sodding work only after planting and other work affecting ground surface has been completed.
- D. Restrict traffic from lawn areas until grass is established. Erect signs and barriers as required.
- E. Provide hose and lawn watering equipment as required.
- F. An irrigation system will be installed prior to sodding. Locate, protect and maintain the irrigation system during sodding operations. Repair irrigation system components damaged during sodding operations at this Contractor's expense.

1.7 WARRANTY:

- A. Refer to Section 02970

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Sod: An "approved" nursery grown blend of improved Kentucky Blue-grass varieties.
 - 1. Sod containing Common Bermudagrass, Quackgrass, Johnsongrass, Poison Ivy, Nutsedge, Nimblewill, Canada Thistle, Timothy, Bentgrass, Wild Garlic, Ground Ivy, Perennial Sorrel or Brome grass weeds will not be acceptable.
- B. Provide well-rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density and free of weeds, undesirable grasses, stones, roots, thatch and extraneous material; viable and capable of growth and development when planted.
- C. Furnish sod machine stripped in square pads or strips not more than 3'-0" long; uniformly 1" to 1-1/2" thick with clean cut edges. Mow sod before stripping.
- D. Fertilizer: Granular, non-burning product composed of not less than 50% organic slow acting, guaranteed analysis professional fertilizer.
 - 1. Type A: Starter fertilizer containing 20% nitrogen, 12% phosphoric acid and 8% potash by weight or similar approved composition.
- E. Ground limestone: Containing not less than 85% of total carbonates and ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20 mesh sieve. Use if determined by soil tests to be necessary.
- F. Stakes: Softwood, 3/4" x 8" long.
- G. Water: Free of substance harmful to sod growth. Hoses or other methods of transportation furnished by Contractor.
- H. Topsoil: Refer to Section 02921

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine finish surfaces, grades, topsoil quality and depth. Do not start sodding work until unsatisfactory conditions are corrected.

3.2 PREPARATION:

- A. Limit preparation to areas which will be immediately sodded. Spread topsoil, fine grade.
- B. Treat lawn areas with "Round Up", by Monsanto, per label directions as required to kill existing vegetation prior to sodding.
- C. Loosen topsoil of lawn areas to minimum depth of 3". Remove stones over 1" in any dimension and sticks, roots, rubbish and extraneous matter.
- D. Grade lawn areas to smooth, free draining and even surface with a loose, uniformly fine texture. Roll and rake; remove ridges and fill depressions as required to drain.
- E. Apply type A fertilizer at the rate equal to 1.0 lb. of actual nitrogen per 1,000 sq. ft. (43 lbs./acre). Apply fertilizer by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with the soil to depth of 1" by discing or other approved methods. Fertilize areas inaccessible to power equipment with hand tools and incorporated it into soil.
- F. Dampen dry soil prior to sodding.
- G. Restore prepared area to specified condition if eroded, settled or otherwise disturbed after fine grading and prior to sodding.

3.3 INSTALLATION:

- A. Lay sod to form a solid mass with tightly-fitted joints. Butt ends and sides of sod strips. Do not overlay edges. Stagger strips to offset joints in adjacent course. Remove excess sod to avoid smothering of adjacent grass. Provide sod pad top flush with adjacent curbs, sidewalks, drains and seeded areas.
- B. Do not lay dormant sod or install sod on saturated or frozen soil.
- C. Install initial row of sod in a straight line, beginning at bottom of slopes, perpendicular to direction of the sloped area. Place subsequent rows parallel to and lightly against previously installed row.
- D. Peg sod on slopes greater than 3 to 1 to prevent slippage at a rate of 2 stakes per yd. of sod.
- E. Water sod thoroughly with a fine spray immediately after laying.
- F. Roll with light lawn roller to ensure contact with sub-grade.
- G. Sod indicated areas within contract limits and areas adjoining contract limits disturbed as a result of construction operations.

3.4 MAINTENANCE:

A. Refer to Section 02970

3.5 ACCEPTANCE:

A. Refer to Section 02970

3.6 CLEANING:

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris and equipment. Repair damage resulting from sodding operations.

END OF SECTION 02934

SECTION 02940 – NATIVE PLUGS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Furnish all labor, materials, equipment and maintenance necessary to provide finished site revegetation. Work includes planting preparation and topsoil, and native plugs.
- B. Related work specified elsewhere:
 - 1. Section 02934: Sodding
 - 2. Section 02950: Herbaceous Plants
 - 3. Section 02970: Landscape Maintenance and Warranty

1.2 QUALITY ASSURANCE

- A. Testing of supplied and/or stockpiled topsoil shall be performed by a qualified independent testing laboratory normally engaged in agronomic soil testing. Each soil sample tested shall be a composite of five to seven subsamples taken the full depth of proposed source. Discard upper 6 inches of stockpiled topsoil before collecting samples. All costs for collecting and testing of topsoil shall be borne by the Contractor.

- 1. Recommended testing laboratory:

A & L Great Lakes Laboratories, Inc.
3505 Conestoga Drive
Fort Wayne, IN 46808
(260) 483-4759

1.3 ENVIRONMENTAL REQUIREMENTS

Installation shall be performed between April 10 and October 1. If site is prepared at any other time of the year, stabilize with the following seed mix per acre.

64 lbs seed oats (*Avena sativa*)
25 lbs annual ryegrass (*Lolium multiflorum*)

Under no circumstances shall the site be stabilized with winter rye, grain rye, or winter wheat. These plants produce toxins that inhibit prairie seed germination.

1.4 SUBMITTALS

- A. Submit two certified copies of soil tests for approval prior to initiating work.
- B. Mulch: Submit for approval the name and address of mulch supplier(s) and a small physical sample of the material to be used, minimum 1 month prior to beginning installation.

- D. Provide all relevant permits, licenses, and authorizations to OWNER/OWNER'S REPRESENTATIVE before initiation of work.
- E. All substitutions, materials or execution, shall be approved by the OWNER/OWNER'S REPRESENTATIVE, in writing, a minimum of 1 month prior to construction. The OWNER/OWNER'S REPRESENTATIVE reserves the right to require a sample of substituted material(s) prior to approval for construction.

1.5 QUALIFICATIONS

- A. Native Plug Suppliers: Obtain native plugs only from established suppliers capable of providing quantities adequate to complete this project. Suppliers shall be required to provide data requested for required submittals prior to use of stock. Suppliers shall be located in Southern Michigan, when possible.
Qualified Suppliers:

Wildtype
900 N. Every Road
Mason, MI 48854
517.244.1140
Contact: Bill Schneider

Michigan Wildflower Farm
11770 Cutler Road
Portland, MI 48875
517.647.6010
Contact: Esther Durnwald

Native Plant Nursery
300 Detroit St
Ann Arbor, MI 48104
734.677.3260
Plants@nativeplant.com
Contact: Greg Vaclavek

PlantWise
66 Barber St
Ann Arbor, MI 48103
734.665.7168
info@plantwiserestoration.com
Contact: David Mindell

- B. All landscaping work shall be performed by a qualified Landscape Contractor. The CONTRACTOR shall be required to demonstrate experience in planting and establishing the specified plant stock herein, which includes experience in installation and establishment of rain gardens.
- C. Native plug sources shall be from southeast Michigan genotypes, preferably from Oakland County.

1.6 REGULATORY REQUIREMENTS

- A. Anticipate field conditions that may result in erosion, fires, noise, dust, and other potentially problematic situations and take steps necessary to reduce or eliminate these conditions in compliance with relevant ordinances and regulations.
- B. All native plugs, original and replacement, shall comply with state and federal Laws and Regulations with respect to inspection for plant diseases and insect infestations.
- C. Adhere to Sediment and Erosion Control Plan for all phases of project in conformance with federal, state, and local regulations.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Pack, handle, and transport plugs in a manner approved for that species and size by OWNER/OWNER'S REPRESENTATIVE. Take precautions that are customary in good trade practice to ensure proper transport and arrival of native plugs.
- B. Store native plugs in a manner to prevent damage or deterioration. Native plugs stored for excessive lengths of time or at a time of year which is not suitable by standard horticultural practice shall not be accepted for planting.
- C. Store native plugs in aboveground locations in non-construction areas approved by OWNER/OWNER'S REPRESENTATIVE if not installed directly.
- D. The following conditions shall render native plugs unacceptable:
 - 1. Native plugs that has been in storage for extended periods of time.
 - 2. Native plugs displaying mold, decay, or physical damage.
 - 3. Plugs in damaged packaging are not acceptable.
- F. The OWNER/OWNER'S REPRESENTATIVE shall reserve the right to refuse any plant material that is unacceptable upon delivery to site.
- G. Changes and/or substitutions of plant materials from what is specified on the drawings are unacceptable without prior written authorization from OWNER/OWNER'S REPRESENTATIVE.
- H. All plant materials shall be inspected and approved by OWNER/OWNER'S REPRESENTATIVE prior to installation on-site.

PART 2 - PRODUCTS

2.1 PLUGS

- A. Plugs shall be in 2 3/8" square X 3 3/4" deep open-bottomed pots. Plugs shall be thoroughly rooted through the container. No species shall be substituted without approval of the architect.
- B. Plugs shall be inoculated with VAM (Vesicular Arbuscular Mycorrhizae) endomycorrhizal fungi as provided by Spence Restoration Nursery or approved source where available.

2.2 MULCH

RUSSELL DESIGN
NATIVE PLUGS

- A. Mulch shall be clean black leaf compost. Compost shall not contain manure or bio-solids

PART 3 - EXECUTION

3.1 VERIFICATION

- A. Verify that site is within 4 inches of specified grade.
- B. Verify that site is clean and free of debris.

3.2 PREPARATION

- A. If vegetation exists on the site, apply a 2 % glyphosate herbicide at least two weeks prior to installation on all actively growing vegetation. Verify that a good kill has resulted from the herbicide application prior to planting.
- B. Spread specified mulch to a depth of two inches across the area to be plugged.
- C. Do not apply any fertilizer other than compost.

3.3 INSTALLATION

- A. Use an auger or other appropriate tool to excavate planting holes on 1 foot centers in a staggered pattern.
- B. Evenly distribute prairie grasses throughout planting. Place wildflowers in informal drifts of 3-7 of any one species with the edges blended into adjacent species to avoid a formal appearance.
- C. Plant plugs level with existing soil grade. Be certain that soil is placed around the plugs and firmed into place. Do not fill around plugs with mulch.
- D. Thoroughly soak plugged area with water until soil is moist to a depth of 4 inches.

3.5 ACCEPTANCE

- A. Plugs shall exhibit vigorous growth and be thoroughly rooted by the end of first growing season.
- B. A minimum of 95% of plugs shall be alive and growing at the end of the first growing season.

END OF SECTION 02940

SECTION 02950 – HERBACEOUS PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions hereby made a part of this Section.

1.2 DESCRIPTION OF WORK:

- A. Extent of trees, shrubs and ground covers is shown on drawing and by provisions of this Section.
- B. Types of work required include the following:
 - 1. Soil preparation
 - 2. Herbaceous Plants
 - 3. Planting mixes
 - 4. Mulch and planting accessories
 - 5. Soil percolation tests
- C. Related work specified elsewhere:
 - 1. Section 02934: Sodding
 - 2. Section 02940: Native Plugs
 - 3. Section 02970: Landscape Maintenance and Warranty

1.3 QUALITY ASSURANCE:

- A. Plant names indicated, comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed conform generally with names accepted by the nursery trade. Provide stock true to botanical name and legibly tagged.
- B. Comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock". A plant shall be dimensioned as it stands in its natural position.
- C. All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of 2 years.
- D. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional charge. Larger plants shall not be cut back to size indicated.
- E. Provide "specimen" plants with a special height, shape or character of growth. Landscape Contractor to tag specimen trees or shrubs at the source of supply. The Landscape Architect will inspect specimen selections at the source of supply for suitability and adaptability to selected location. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval. The Landscape Contractor shall inspect all plant material at source prior to Landscape Architect's approval. Landscape Contractor shall accompany Landscape Architect on final selection trip.

- F. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work.
- G. Provide percolation testing by filling plant pits with water and monitoring length of time for water to completely percolate into soil. Submit test results to landscape architect prior to starting work.

1.4 SUBMITTALS:

- A. Submit the following material samples:
 - 1. Double Shredded Hardwood mulch.
- B. Submit the following materials certification:
 - 1. Topsoil source and pH value
 - 2. Plant fertilizer

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Deliver fertilizer materials in original, unopened and undamaged containers showing weight, analysis and name of manufacturer. Store in manner to prevent wetting and deterioration.
- B. Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Dig, pack, transport and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival. A copy of certificate shall be filed with the Landscape Architect. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss or in a manner acceptable to the Landscape Architect. Water heeled-in plantings as required to keep root system moist until planting. No plant shall be bound with rope or wire in a manner that could damage or break the branches.
- C. Cover plants transported on open vehicles with a protective covering to prevent windburn.
- D. Frozen or muddy topsoil is not acceptable.

1.6 PROJECT CONDITIONS:

- A. Work Notification: Notify Architect at least 7 working days prior to installation of plant material.
- B. Protect existing utilities, paving and other facilities from damage caused by landscaping operations. See AIA General Conditions.
- C. A complete list of plants, including a schedule of sizes, quantities and other requirements is shown on the drawings. In the event that quantity discrepancies or material omissions occur, the Contractor shall notify the Landscape Architect during the proposal bidding process.
- E. Perform percolation testing.
- F. Verify availability of on-site water.
- G. Concealed contingencies. Refer to AIA General Conditions.

1.7 WARRANTY:

- A. Refer to Section 02970.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Plants: Provide plants typical of their species or variety; with normal, densely developed and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, plant diseases, insect eggs, borers and all forms of infestation. All plants shall have a fully developed form without voids and open spaces.
 - 1. Plants planted in rows shall be matched in form.
 - 2. Plants larger than those specified in the plant list may be used when acceptable to the Landscape Architect.
 - 3. If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.
- B. Container-grown Stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
 - 1. No plants shall be loose in the container.
 - 2. Container stock shall not be root bound.
 - 3. The measurements for height shall be taken from the ground level to the average height of the top of the plant and not the longest branch.
 - 4. Single stemmed or thin plants will not be accepted.
 - 5. Side branches shall be generous, well twigged and the plant as a whole well bushed to the ground.
 - 6. Plants shall be in a moist, vigorous condition, free from dead wood, bruises or other root or branch injuries.
- C. Topsoil for Planting Mix: Refer to Section 02935.
- D. Peat Moss: Brown to black in color, weed and seed free granulated raw peat.
 - 1. Provide ASTM D 2607 sphagnum peat moss with a PH below 6.0 for ericaceous plants.
- E. Planting Mixture Type A: Standard planting backfill shall be a mixture of 1/3 topsoil, 1/3 sand and 1/3 compost (containing not more than 5% clay) per cubic yard of mixture. Add fertilizer Type "A" to planting mixture per manufacturer's requirements. Follow planting details.
- F. Plant Fertilizer Type A: "Scotts Pro Grow 18-3-6 landscape fertilizer plus minors, applied per manufacturer's recommendations.

- G. Superphosphate: Composed of finely ground phosphate rock as commonly used for agricultural purposes containing not less than eighteen (18%) percent available phosphoric acid. Apply as required based upon soil test report.
- H. Lime: Ground dolomitic limestone, ninety-five (95%) percent passing through #100 mesh screen. Use to adjust soil pH only, under direction of Landscape Architect or based upon soil test report.
- I. Sand: Clean, coarse, ungraded conforming to ASTM C 3 for fine aggregates.
- J. Double Shredded Hardwood Mulch: Clean, free of debris and sticks, and well aerated. Materials shall be uniform in size, shape and texture. Submit samples to owner for approval prior to installation.
- K. Water: Free of substances harmful to plant growth. Hoses or other methods of transportation furnished by Contractor.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.

3.2 PREPARATION:

- A. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.
- B. Individual plant locations shall be staked on the project site by the Contractor and approved by the Landscape Architect before any planting pits are dug. The Landscape Architect reserves the right to adjust plant material locations to meet field conditions, without additional cost to the Owner.
- C. Planting pits shall be round, with vertical sides and flat bottoms and sized in accordance with outlines and dimensions shown on the planting details.
- D. If obstructions are encountered that are not indicated, do not proceed with planting operations until alternative plant locations have been selected and approved in writing by the Landscape Architect. Where location or spacing dimensions are not clearly shown, request clarification by the Landscape Architect.
- G. See drawings for planting details.
- H. Vegetation Removal:
 - 1. Strip existing grass and weeds, including roots, from all bed areas, till and fine grade existing topsoil, leaving the soil surface one inch below finished grade (in areas shown on plan).
 - 2. Herbicide: Use Round Up (Monsanto Co.) as required to prepare areas for new planting, applied to all ground cover, evergreen and shrubbery beds and all mulch areas before application of pre-emergence herbicide, per manufacturer's recommendations. Clean area of all dead material after five (5) days.

3. Pre-Emergence Herbicide: DACTHAL W-75 (Diamond Shamrock Agricultural Chemicals) applied to one (1) ounce per 100 square feet to same area where "Herbicide" has been applied and after area is cleared of dead vegetation.
4. Herbicides to be applied by licensed applicator as required by the state.

3.3 INSTALLATION:

- A. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide plant pits per planting details. Depth of pit shall accommodate the root system.
- B. Excavate existing soil to 12" depth over entire bed area and remove soil from site. Set plants according to drawings and backfill entire bed with pre-mixed planting mixture Type "B".
- E. Planting:
 1. Space plants in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 6" of edge of bed.
 2. Water immediately after planting.
- F. Mulching:
 1. Mulch planting shrub beds with required mulching material 1-1/2" deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

3.4 MAINTENANCE:

- A. Refer to Section 02970.

3.5 CLEANING:

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris and equipment. Repair damage resulting from planting operations.

END OF SECTION 02950

SECTION 02970 - LANDSCAPE MAINTENANCE AND WARRANTY STANDARDS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS:**

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.2 DESCRIPTION OF WORK:

- A. The requirements of this section include a one year warranty period from date of acceptance of installation.
- B. Related Work Specified Elsewhere:
 - 1. Section 02934: Sodding
 - 2. Section 02940: Native Plugs
 - 3. Section 02950: Herbaceous Plants

1.3 ACCEPTANCE OF INSTALLATION:

- A. At the completion of all landscape installation, or pre-approved portions thereof, the Landscape Contractor to make submit a written request for review of installation in a timely fashion. After this inspection a "Punch List" will be issued by the Landscape Architect and/or Owner's Representative. After completion of punch list items, the Landscape Architect, Contractor and Owner's Representative shall re-inspect the project and upon satisfactory completion of punch list items, issue a written statement of acceptance of installation and establish the beginning of the project warranty period.
- B. It is the responsibility of the Landscape Contractor to make the above written request for review of the installation in a timely fashion. If there is plant material loss prior to the Landscape Contractor's written request for inspection of installation, the Landscape Contractor shall make all replacements of this dead material at no additional cost. These replacements are not considered to be the required one (1) replacement of dead plant material by the Landscape Contractor during the three (3) year project warranty period, as outlined below.
- C. The Landscape Contractor shall maintain all planting areas as described herein. At the completion of the three year maintenance and warranty period. The Landscape Contractor shall submit a written request for review of the installation
- D. Landscape work may be reviewed for acceptance in parts agreeable to Owner's Representative and Landscape Architect provided work offered for inspection is complete, including maintenance as required.
- E. For work to be reviewed for partial acceptance, supply a written statement requesting acceptance of this work completed to date.

1.4 PROJECT WARRANTY:

- A. The project warranty period begins upon written acceptance of the project installation by Landscape Architect and Owner's Representative.

- B. The Landscape Contractor shall guarantee herbaceous planting areas through construction and for a period of three years after date of acceptance of installation against defects including death and unsatisfactory growth, except for defects resulting from neglect by owner, abuse or damage by others, or unusual phenomena or incidents which are beyond Landscape Contractor's control.
- C. The Landscape Contractor shall warranty plants due to overwatering or under watering during maintenance and warranty period.

1.5 MAINTENANCE- NATIVE PLUGS

- A. To insure guarantee standards, the following maintenance procedures shall be executed during construction and for the full project warranty period.
- B. First year:
 - 1. Watering: for optimum plant growth, plugs and plants should be kept moist (1" of total water per week, including rainfall) until vegetation is 4" high typical.
- C. Second year:
 - 1. Non-native species control: hand pulling may be needed during the second year. common competitive weeds in the second year include spotted knapweed, canada thistle, burdock, wild parsnip, sweet clover, and queen anne's lace.

1.6 MAINTENANCE- SODDED LAWN

- 1. Maintain sodded lawn areas, including watering, fertilizing, spot weeding, mowing, application of herbicides, fungicides, insecticides, and resodding until a full, uniform stand of sod is knitted to topsoil.
- 2. Water sod thoroughly, as required to establish proper rooting.
- 3. Repair, rework and resod all areas that have washed out or are eroded. Replace undesirable or dead areas with new sod.
- 4. Provide a uniform stand of grass by watering, mowing, and maintaining lawn areas until acceptance of installation. Resod areas, with specified materials, which fail to provide a uniform stand of grass until all affected areas are accepted by Landscape Architect.
- 5. Mow lawn areas as soon as lawn top growth reaches a 3" height. Cut back to 2" height. Repeat mowing as required to maintain specified height. Not more than 40% of grass leaf shall be removed at any single mowing. Minimum of two cuttings.
- 6. Sodded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, even colored viable lawn is established, free of weed, undesirable grass species, disease, and insects.
- 7. After acceptance of installation, and for the duration of the one-year warranty period the Landscape Contractor shall continue all maintenance procedures including fertilizing, weeding, rolling, regrading, resodding and applying herbicides, fungicides, insecticides as required to establish a smooth acceptable lawn, free of eroded or bare areas. The landscape contractor is not responsible for mowing after acceptance of installation.

8. At Conclusion of project warranty period and after receiving written final acceptance by Owner's Representative and Landscape Architect, the Owner shall assume all sodded lawn maintenance responsibilities.

1.8 FINAL ACCEPTANCE:

- A. At the conclusion of the project warranty period the Landscape Contractor shall request a project inspection for final acceptance in which the Landscape Contractor, Landscape Architect and Owner's Representative shall be present. After this inspection a "Punch List" will be issued by the Landscape Architect. Upon completion of all punch list items, the Landscape Architect and Owner's Representative shall reinspect the project and issue a written statement of final acceptance. Upon final acceptance the Owner assumes all maintenance responsibilities for the landscape of the project.

PART 2 AND 3 - PRODUCTS AND EXECUTION

Not Applicable.

END OF SECTION 02970

SECTION 03300 - CONCRETE WORK**PART 1 - GENERAL**1.01 **DESCRIPTION OF WORK:**

- A. Extent of typical concrete work shown as indicated in the Documents and specified herein, including but not limited to the following:
 - 1. Foundations and footings:
 - a. **Provide a vapor and/or dampproofing barrier at all concrete foundations/walls that separate an occupied space from soils/environment exposed to the weather.**
 - 2. Slabs on grade:
 - a. **Provide vapor barriers under all interior concrete slabs that come into direct contact with soil.**
 - 3. Frost-blocks and entry flatwork not shown on Civil Documents or as supplements to Civil Documents.
 - 4. Cast-in-place concrete for stair treads and/or landings
- B. Accessories for concrete formwork, installation and reinforcement
- C. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete
- D. Field finishing of concrete surfaces
- E. Formwork for cast-in-place concrete, with shoring, bracing and anchorage

1.02 **RELATED SECTIONS:**

- A. Section 04200 - Unit Masonry: Supply of masonry accessories for placement by this section
- B. Section 05500 - Metal Fabrications: Supply of metal fabrications for placement by this section
- C. Section 07200 – Insulation: for foundation and perimeter Insulation
- D. Section 07620 - Sheet Metal Flashing and Trim: Supply of flashing reglets for placement by this section
- E. Section 07900 – Joint Sealants
- F. Division 15 - Mechanical: Supply of mechanical items for placement by this section
- G. Division 16 - Electrical: Supply of electrical items for placement by this section.

1.03 **QUALITY ASSURANCE:**

- A. Codes and Standards -- Comply with the provisions of latest editions of the following:
 - 1. ACI 301 "Specifications for Structural Concrete for Buildings"
 - 2. ACI 302 "Recommended Practice for Concrete Floor and Slab Construction"
 - 3. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete"
 - 4. ACI 308 - Standard Practice for Curing Concrete
 - 5. ACI 311 "Recommended Practice for Concrete Inspection"
 - 6. ACI 318 "Building Code Requirements for Reinforced Concrete"
 - 7. ACI 347 "Recommended Practice for Concrete Formwork"
 - 8. ASTM C171 - Sheet Materials for Curing Concrete.
 - 9. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
 - 10. ACI 303R-91 "Guide to Cast-In-Place Architectural Concrete Practice"
 - 11. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement
 - 12. Concrete Reinforcing Steel Institute, "Manual of Standard Practice", except where more stringent requirements are shown or specified.
 - 13. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.
 - 14. CRSI 63 - Recommended Practice For Placing Reinforcing Bars
- B. Installers: Installation of concrete paving, including any special architectural concrete work, shall be carried out by contractors and their employees who are thoroughly experienced and skilled in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this section.
 - 1. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

2. Design formwork under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the **State of Michigan**.
3. Installation Company and crew shall have a minimum of five (5) years of documented experience in projects comparable to the work described on the Drawings and specified herein.
- C. Installers: Installation of concrete paving, including any special architectural concrete work, shall be carried out by contractors and their employees who are thoroughly experienced and skilled in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this section.
 4. Design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.
 5. Design formwork under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the **State of Michigan**.
 6. Installation Company and crew shall have a minimum of five (5) years of documented experience in projects comparable to the work described on the Drawings and specified herein.
- D. Preinstallation Conference - Conduct conference at Project site to comply with requirements of Division 1 and the following:
 1. At least 30 days prior to submitting design mixes. Conduct a meeting to review detailed requirements for preparing concrete design mixes.
 2. Establish preliminary work progress schedule and procedures for materials inspection, testing and certifications.
- E. Single Materials Source: Obtain each material from same source throughout to ensure consistency of finished work. Provide "system" products from a single manufacturer to ensure compatibility.
- F. Where special treatments, admixtures or processes are to be used in architectural concrete work, the Architect shall receive Field Service Reports at regular intervals from the associated manufacturer's representative documenting the progress of the work.

1.04 REQUIRED SUBMITTALS:

- A. Concrete Mix Designs and location of all placements.
- B. Reinforcing Placing Drawings for all structural concrete work.
- C. Laboratory Test Reports: The testing agency shall submit 3 copies of laboratory test reports for concrete materials, for mix design tests and for results of field quality control testing to the Architect, the Owner, Contractor and concrete producer on same day tests are made.
 1. Submit proposed mix design to Architect for review prior to commencement of work.
- D. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.
- E. Product Data: Submit manufacturer's product data for all products and materials certifying compliance with specified requirements.

1.05 INCONSISTENCIES:

- A. In the case that a discrepancy exists between two or more stated or implied characteristics of any product, assembly, technique, and application, etc., between any one or more Sections of this Project Manual, any one or more Paragraphs of this Specification, or between the Drawings and Specifications, the Contractor's Bid amount shall reflect the most costly version or combination of the requirement(s).

PART 2 – PRODUCTS

2.01 CONCRETE MATERIALS AND ADMIXTURES:

- A. Portland Cement: ASTM C 150,
 1. **Type I** for normal interior construction and sub-surface installations
 2. **Type IA** – air-entrained, for exterior flat-work and other exposed-to-the-elements applications
 3. Use one brand of cement throughout Project.

- B. Normal-weight aggregates: ASTM C33.
 - 1. Provide aggregates from a single source for exposed concrete.
 - 2. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that may cause spalling.
- C. Fly Ash:
 - 1. ASTM C 618, Type C
 - 2. Allowed based on the design properties of the concrete mixture submitted.
- D. Water:
 - 1. Clean, potable and free of substances detrimental to concrete and reinforcing.
- E. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- F. Air-Entraining Admixture: ASTM C 260 certified compatible with other required admixtures by the manufacturer.
 - 1. **Air-entraining is required for all exterior concrete – unless otherwise noted. 6% +/- 1% content**
 - 2. Products: Subject to requirements, provide one of the following:
 - a. Air-mix or Perma-Air, Euclid Chemical Co
 - b. Micro Air by BASF
 - c. Darex AEA or Daravair, W.R. Grace
 - d. Sealtight AEA, W.R. Meadows
- G. Water-reducing Admixture, and other Retarders/Accelerators:
 - 1. Where required, shall comply with ASTM C 494, Type A. Use only admixtures which have been tested and accepted in mix designs, unless otherwise acceptable. Submit all admixes for review.
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Eucon WR-91, Euclid Chemical Co.
 - b. Pozzoloth, Normal or Polyheed, Master Builders, Inc
- H. Calcium Chloride:
 - 1. **Calcium chloride will not be permitted in concrete mix.** Use cold weather non-chloride, non-corrosive set accelerators only with written approval of Architect. Provide Product Data for Architect approval prior to use in accordance with 1.04 "Submittals".

2.02 CONCRETE MIX DESIGN:

- A. Proportion normal weight mixes by either laboratory trial batch or field experience method, complying with ACI 211.1.
 - 1. Submit written reports of each proposed mix for each class of concrete to Architect at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Architect.
 - 2. Mix designs may be adjusted when material characteristics, job conditions, weather, test results or other circumstances warrant. Do not use revised concrete mixes until submitted to and reviewed by the Architect.
- B. Use air-entraining admixture in all concrete which will be exposed to freezing and thawing, providing not less than 5% or more than 7% entrained air and in compliance with ACI 301, Table 3.4.1.
- C. Use set-retarding admixtures during hot weather only when approved by Testing Laboratory.
- D. Limit the use of fly ash to not exceed 20 percent of cement content by weight.
- E. Design the mix to produce standard weight (unless otherwise noted – See Civil/Structural Documents which shall govern if noted) concrete consisting of Portland cement, aggregate, water, and specified admixtures to produce the following properties, per the given applications:
 - 1. **Compressive Strength:** If greater compressive strength values are indicated on Structural Drawings, they shall take precedence over the following.
 - a. Exterior flat work and/or low walls: 3,500 psi minimum at 28 days
 - b. Foundations and footings: 3,000 psi minimum at 28 days
 - c. Interior Slabs – normal traffic: 3,000 psi minimum at 28 days
 - d. Exterior concrete exposed to view - Air-Entrained: 4000 psi minimum, water/cement ratio 0.44

2. **Slump Range:**
 - a. Ramps, slabs, and sloping surfaces on grade - Not more than 3"
 - b. Reinforced foundation systems - Not less than 2" and not more than 4"
 - c. Concrete containing high-range water reducing admixture - not more than 8" after attaining a site-verified 2 - 4" slump concrete.
 - d. Other concrete - Not more than 4"
3. Water Cement Ratio:
 - a. The maximum water-cement ratio shall be in accordance with ACI 301 except as follows:
 - 1) For thin sections (railings, curbs, sills, ledges, ornamental work) and sections with less than 1" cover over steel, maximum water-cement ratio for severe weathering area shall not exceed 0.45.
 - 2) For all other structures in severe weathering area, maximum water-cement ratio shall not exceed 0.50.
4. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in Work.

2.03 ADDITIONAL ADMIXTURES:

- A. Use water-reducing admixture or high-range water-reducing admixture in concrete, as required for placement and workability.
- B. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated, Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent with the following limits:
 1. Concrete structures and slabs exposed to freezing and thawing, de-icer chemicals, or hydraulic pressure:
 - a. 5.5 percent of 1-1/2" maximum aggregate
 - b. 6 percent for 1" maximum aggregate
 - c. 6 percent for 3/4" maximum aggregate
 - d. 7 percent for 1/2" maximum aggregate
 2. Other concrete not exposed to freezing, thawing, or hydraulic pressure, or to receive a surface hardener: 2 to 4 percent air.
 3. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.04 FORM MATERIALS:

- A. General:
 1. Provide form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
- B. **Exposed Concrete Surfaces.** See Documents for requirements of formwork, and choose from the following:
 1. Wood/Non-Specific Form Materials:
 - a. Exposed surface form materials: Clear surface MDO plywood, metal, metal-framed plywood or other acceptable panel-type materials with strength and stiffness to leave straight surface with less than 1/8" deflection between studs. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.
 - b. This formwork shall be used as needed for all smooth surface requirements at the choice of the contractor and as reviewed/approved by the Architect.
 2. Acceptable panel-type to provide continuous, straight, smooth, as-cast surfaces. Use largest practical sizes to minimize form joints.
 3. Cylinder forms for columns and bollards providing clear surface without spirals and forming a continuous, straight, plumb surface.
- C. **Unexposed Concrete Surfaces:**

1. Suitable material for project conditions
 2. Hand trim sides and bottom of earth forms. Maintain a clean bottom. Remove loose soil prior to placing concrete.
 3. **Earth sides are not allowed for grade beams and footings**, unless noted otherwise. Form grade beams and footings with wood materials.
- D. Formwork Accessories:
1. Form Ties: Snap off type, factory-lubricated, galvanized metal, fixed length, cone type, 1 1/2 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.
 2. Form Release Agent: Colorless releasing agent with a maximum of 350 mg/l volatile organic compounds (VOCs) which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
 3. Corners: Chamfered, rigid plastic or wood strip type; 3/4 x 3/4 inch size; maximum possible lengths.
 4. Dovetail Anchor Slot: Galvanized steel, 22-gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
 5. Flashing Reglets: Rigid PVC, 22 gage thick, longest possible lengths, with alignment splines for joints, release tape sealed slots, anchors for securing to concrete formwork.
 6. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

2.05 ERECTION OF FORMWORK:

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members that are not indicated on Drawings.
- F. Provide fillet or chamfer strips on external corners of walls.
- G. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
- H. Coordinate this section with other sections of work that require attachment of components to formwork.
- I. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

2.06 REINFORCING MATERIALS:

- A. Steel Reinforcement:
 1. Reinforcing Steel: ASTM A 615, Grade 60, 60 ksi yield grade – at minimum; deformed billet steel bars, unfinished – or as noted required below:
 - a. All footings/foundations shall have reinforcing as indicated in the Documents, or at a minimum - as referenced below. Refer to Structural Documents first and default to Architectural Documents if no Structural exists.
 - 1). **All footings shall have a min. of two (2) #4 reinforcement bars**, continuous with a min. 3" of concrete cover to bottom/sides of footing. See Documents for additional information.
 - b. All interior slabs shall have reinforcing as indicated in the Documents, or at a minimum - as referenced below. Refer to Civil/Structural Documents first and default to Architectural Documents if no Civil/Structural exists.
 - 1). **All interior slabs shall have a minimum of 6x6 – W1.4 x W1.4 welded wire fabric reinforcing.**
 2. Welded Steel Wire Fabric: ASTM A 185 Welded Steel Wire Fabric, in flat sheets - unfinished.

3. Galvanized Reinforcing bars: ASTM A 767, Class II (2.0 oz. zinc psf) Class I (3.0 ox. zinc psf) hot-dip galvanized, after fabrication and bending.
4. Steel Wire: ASTM A 82, plain, cold-drawn steel. Sizes of mesh/welded wire fabric noted on Documents shall be as related to the Table below:

| Rectangular welded wire fabric. | | |
|--|------------------------------------|----------------------------|
| Style designation | | |
| Weight | | |
| by steel wire gauge | by W-number | (lb./100 ft ²) |
| 6 x 6 – 10 x 10 | 6 x 6 – W1.4 x W1.4 | 21 |
| 6 x 6 – 8 x 8 | 6 x 6 – W2.1 x W2.1 | 30 |
| 6 x 6 – 6 x 6 | 6 x 6 – W2.9 x W2.9 | 42 |
| 6 x 6 – 4 x 4 | 6 x 6 – W4.0 x W4.0 | 58 |
| 4 x 4 – 10 x 10 | 4 x 4 – W1.4 x W1.4 | 31 |
| 4 x 4 – 8 x 8 | 4 x 4 – W2.1 x W2.1 | 44 |
| 4 x 4 – 6 x 6 | 4 x 4 – W2.9 x W2.9 | 62 |
| 4 x 4 – 4 x 4 | 4 x 4 – W4.0 x W4.0 | 85 |
| 4 x 12 – 8 x 12 | 4 x 12 – W2.1 x W0.9 ^{2/} | 25 |
| 4 x 12 – 7 x 11 | 4 x 12 – W2.5 x W1.1 ^{2/} | 31 |
| Style designation is defined in ACI Standard 315 of the American Concrete Institute. | | |

- B. Accessories:
 2. Tie Wire: Minimum 16 gage annealed type.
 3. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture. Use wire bar-type supports complying with CRSI specifications.
 - a. Slab-on-grade – use supports with sand plates or horizontal runners where base material will not support chair legs.

2.07 RELATED MATERIALS:

- A. Vapor Retarding:
 1. **All Slabs-on-grade shall have a moisture/vapor barrier installed below the slab.** Refer to Documents to determine whether the barrier is applied above or within the granular bed supporting the slab. All joints shall be taped to create a single, continuous membrane. All penetrations or breaks in the membrane shall be taped/sealed to complete the membrane protection.
 2. All moisture/vapor barriers, used in contact with soil or granular fill, shall be impermeable and shall meet ASTM E-1745. Provide a membrane with minimum properties as follows:
 - a. 10 mil vapor retarder, polyolefin geo-membrane with WVTR of 0.03 Perms as tested by ASTM E-96.
 3. Follow manufacturer's recommendations and ASTM E-1745-97/ASTM E 1643-98 for all installation procedures.
- B. Moisture-Retain Cover: the following shall comply with the ASTM C 171:
 1. Waterproof paper
 2. Polyethylene film
 3. Polyethylene-coated burlap
- C. Concrete Sealers: **Seal all interior, exposed concrete slabs.** Prior to application of sealer, cure concrete according to manufacturer's recommendations. Provide one of the following:
 1. Day-Chem Sure Hard (J17), Dayton Superior
 2. Intraseal, Conspec Marketing and Mfg. Co.
 3. or similar

- D. Bonding Agent: Polyvinyl acetate or acrylic base. Subject to compliance with field conditions, and as required - provide one of the following:
 - 1. Polyvinyl Acetate (Interior only)
 - a. Superior Concrete Bonder, (J-41) Dayton Superior Corp.
 - b. Euco Weld, Euclid Chemical Co.
 - c. Everweld, L&M Construction Chemical, Inc.
 - 2. Acrylic or Styrene Butadiene:
 - a. Day-Chem Ad Bond, Dayton Superior Corp.
 - b. SBR Latex, Euclid Chemical Co.
 - c. Daraweld C, W.R. Grace & Co.
- E. Epoxy Adhesive: Per ASTM C881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements. Subject to compliance with field conditions, provide one of the following:
 - 1. Resi-Bond (J-58), Dayton Superior
 - 2. Euco Epoxy System #452 or #620, Euclid Chemical Co.
 - 3. Rexi-Weld 1000, W.R. Grace & Co.
- F. Joint Fillers and Sealants:
 - 1. Install a joint sealant to interior slabs not scheduled to receive an additional finish.
 - 2. See Section 07900.

PART 3 - EXECUTION

3.01 FORMING CONCRETE:

- A. Placing Concrete - General: Place concrete continuously between pre-determined construction joints. Do not break or interrupt successive pours such that cold joints occur without consideration for a construction/expansion joint. **Place concrete to scoring pattern indicated on drawings or as required by ACI 301.** All joints to be straight lines, or smooth curves at the direction of the Architect. Place Concrete per:
 - 1. Typical concrete in accordance with ACI 301.
 - 2. Ready-Mixed Concrete: ASTM C 94.
 - 3. Hot Weather Placement: ACI 301.
 - 4. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.
- B. Preparation:
 - 1. Place moisture barrier over between layers of compacted fill, just prior to placement of reinforcement. Keep foot traffic over moisture barrier to a minimum. Lap all joints a minimum of 6".
 - 2. Tape all moisture barrier joints with approved material/system as recommended by the manufacturer.
- C. Formwork:
 - 1. Construct so that concrete forms and structures are of correct size, shape, alignment, elevation and position, complying with ACI 347.
 - a. Provide Class A tolerances for concrete surfaces exposed to view.
 - b. Provide Class C tolerances for other concrete surfaces.
 - 2. Provide openings in framework to accommodate work of other trades, accurately place, and securely support items built into forms.
 - 3. Clean and adjust forms and/or form liners prior to concrete placement. Apply form release agents or wet forms, as required. Retighten forms during and after concrete placement, if required, to eliminate mortar leaks.
 - 4. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
 - 5. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- D. Steel Reinforcement:
 - 1. Reinforcement shall meet ACI 301 and 318 requirements. Position, support and secure reinforcement against displacement. Locate and support with metal chairs, runners,

- bolsters, spacers and hangers, as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- a. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
 - b. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that may reduce or destroy bond with concrete.
2. Unless otherwise noted, reinforcing shall have a Class B splice.
 - a. Min. lap splice for all bars shall be 12".
 3. **Interrupt reinforcement at expansion joints.**
- E. Joints:
1. **All Joints shall meet ACI 301 requirements.** Provide expansion, control (contraction), construction and any other decorative or required joints as required of ACI 301 and/or as indicated on Drawings. If none shown, Contractor shall install joints conforming to ACI 301 requirements and best industry standards and practices.
 - a. Typical "**contraction joints**" or control joints should be at approx. 2x the slab thickness in feet (ie. – 4" slab thickness = 8 foot control intervals). Contractor shall provide joint layout for Architect's approval for all Decorative concrete construction.
 - b. Typical "**expansion joints**" for slab movement shall be at a min. of 30 feet on center and shall have a full joint with a flexible filler and a joint sealant typically, or as required by these Documents. Install a dowel bars and support assemblies at joints if indicated in Documents.
 - c. Typical "**isolation joints**" shall be installed where concrete abuts another, fixed wall, structural member or other structure – typical. Construction shall be similar to expansion joints.
 2. Locate construction joints so as to not impair the strength and appearance of the structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and random cracking.
 3. All joints to be neatly made straight lines or smooth curves if shown to complete an Architectural pattern.
 4. **All interior control and construction joints in floor slabs not scheduled to receive an additional finish shall have a joint sealant installed.** Coordinate with Section 07900 – Joint Sealants – for additional information.
 5. Apply sealants as required to all joint installations.
- F. Installation of Embedded Items:
1. Embedded items shall meet ACI 301 requirements. Set and build into the work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting diagrams, templates and instructions provided by others for locating and setting.
- G. Vapor Retarder/Barrier Installation
1. **All interior slabs on grade shall have a vapor retarder/barrier installed.**
 2. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.
 3. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

3.02 PLACING CONCRETE:

A. Concrete Placement:

1. Comply with ACI 304, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
2. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all part of forms.
3. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement, and curing – for the entire length of time required to achieve design strengths.

- a. In cold weather, comply with ACI 306.
 - 1) Do not use calcium chloride, salt or other materials containing anti-freeze agents. Use non-chloride or non-anti-freeze containing cold weather agents only with Architect's approval.
 - 2) Use chemical accelerators only as accepted in mix designs.
- b. In hot weather, comply with ACI 305.
 - 1) Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90°F (32°C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2) Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 - 3) Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 - 4) Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Architect.
- c. Maintain future, ambient temperatures during curing to minimize 'temperature contraction'. Any slabs with 4" – 6" slab thicknesses shall have contraction joints per ACI 304 and in strict accordance with contraction joint frequencies.
 - 1) Per ACI 360 – Design of Slabs-on-Ground, follow recommendations to minimize shrinkage and curling of slabs.

B. Joints:

1. **All Joints shall meet ACI 301 requirements.** Provide expansion, control (contraction), construction and any other decorative or required joints as required of ACI 301 and/or as indicated on Drawings. **If joint are not indicated on Documents**, Contractor shall install joints conforming to ACI 301 requirements and best industry standards and practices similar to:
 - a. Typical "contraction joints" or control joints should be at approx. 2x the slab thickness in feet (i.e. – 4" slab thickness = 8 foot control intervals). Contractor shall provide joint layout for Architect's approval. **All Decorative concrete construction shall have a complete Shop Drawing submittal indicating all joints.**
 - b. Typical "expansion joints" for slab movement shall be at a min. of 30 feet on center and shall have a full joint with a flexible filler and a joint sealant typically, or as required by these Documents. Install dowel bars and/or support assemblies at joints if indicated in Documents.
 - c. Typical "isolation joints" shall be installed where concrete abuts another, fixed wall, structural member or other dissimilar structure – typical. Construction shall be similar to expansion joints.
2. **Locate construction joints** so as to not impair the strength and appearance of the structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and random cracking.
3. All joints to be neatly made straight lines or smooth curves if shown to complete an Architectural pattern.
4. **All interior control and construction joints in floor slabs not scheduled to receive an additional finish shall have a joint sealant installed.** Coordinate with Section 07900 – Joint Sealants – for additional information.
5. Apply sealants as required to all joint installations.

3.03 CONCRETE FINISHES:

A. Finishing Formed Surfaces in Concrete-work:

1. Direct-Application Surfaces:
 - a. Provide a smooth trowelled finish for concrete surfaces that are to receive a finish coating or where the concrete will serve as a subfloor for finish material directly applied. Remove fins and projections, patch defective areas with cement grout, and finish smooth. **The following tolerances shall be met for all conditions:**

- i. Where concrete is to receive a thin set tile floor finish, maximum surface variation shall not exceed 1/8" in 10'-0". New slabs to receive floor tile shall not be treated with curing or acceleration compounds, form-release agents or other additives that will interfere with tile bonding.
 - ii. Where concrete is to receive resilient flooring finish or carpeting, maximum surface variation shall not exceed 1/8" in 10'-0". Provide slab trowel finish.
 - iii. Correct defects by removal and replacement of the defective work.
 - b. Where concrete is to receive a thin set tile floor finish, maximum surface variation shall not exceed 1/8" in 10'-0". New slabs to receive floor tile shall not be treated with curing or acceleration compounds, form-release agents or other additives that will interfere with tile bonding.
 - c. Where concrete is to receive resilient flooring finish, maximum surface variation shall not exceed 1/8" in 10'-0". Provide slab trowel finish.
 2. Exposed-to-View Surfaces – Float Finish:
 - a. Apply float finish to monolithic slab surfaces that are exposed-to-view. After screeding, consolidate and level concrete surface. Do not work surface until ready for floating. Float using float blades or float shoes only when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats. Level uniformly tolerance of F(F) (floor flatness) and F(L) (floor levelness) according to ASTM E 1155.
 - 1) F (F) 20, local F (F) 15
 - 2) F (L) 15, local F (L) 10
 3. Non-Slip Broom Finish:
 - a. Apply non-slip broom finish to exterior concrete walks and elsewhere as shown on the Drawings. Immediately after trowel finishing, slightly roughen surface by drawing a fiber bristle broom across surface, perpendicular to main traffic route.
- B. Monolithic Slab Finishes – Typical:
1. **Scratch Finish:** Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, Portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
 - a. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.
 2. **Float Finish – Prep for Trowel Finish:** **Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo;** and where indicated.
 - a. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to the following tolerances of F(F) (floor flatness) and F(L) (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
 - 1) F (F) 20, local F (F) 15
 - 2) F (L) 15, local F (L) 10
 3. **Trowel Finish:** **Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.**
 - a. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface.
 - 1) Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to the following

tolerances of F(F) (floor flatness) and F(L) (floor levelness) measured according to ASTM E 1155.

- i. Floor slabs to receive wood flooring:
F (F) 50, local F (F) 25
F (L) 30, local F (L) 15
- ii. Typical Floor Slabs:
F (F) 30, local F (F) 15
F (L) 20, local F (L) 10
- b. Grind smooth any surface defects that would telegraph through applied floor covering system.
4. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.
5. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - a. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.04 CURING:

- A. Curing of concrete shall meet ACI 301, and 305 or 306 (as appropriate), beginning as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 72 hours. Continue curing by use of moisture-retaining cover, or (unless otherwise prohibited) membrane-forming curing compound. Cure formed surfaces by moist curing until forms are removed. Provide protection as required to prevent damage to exposed concrete surfaces.
- B. Concrete Protection in winter for ice and snow conditions:
 1. Use 'safe', non-toxic de-icers when required to melt snow and ice on newly placed concrete. Use the 'safest' product available at the time of use. Recommendations are:
 - a. Use magnesium chloride as required to temperature to 5 degrees Fahrenheit.
 - b. Use calcium chloride as required when temperatures are below 5 degrees Fahrenheit.

3.05 QUALITY CONTROL TESTING DURING CONSTRUCTION:

- A. Testing laboratory employed by the Owner will perform sampling and testing during concrete placement in accord with requirements of ACI 301, which may include the following:
 1. Sampling:
 - a. ASTM C 172
 2. Slump:
 - a. ASTM C 143, one for each set of compressive strength specimens or whenever concrete consistency appears to vary, but not fewer than one for each load at point of discharge.
 3. Air Content:
 - a. ASTM C 173, one for each set of compressive strength specimens.
 4. Compression Test Specimen:
 - a. ASTM C 31, one set of 6 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 5. Compressive Strength:
 - a. ASTM C 39, one set for each 50 cubic yards or fraction thereof of each class of concrete; 2 specimens tested at 7 days, 3 specimens tested at 28 days, and one retained for later testing if required.
 - b. When the total quantity of a given class of concrete is less than 50 cubic yards, the strength tests may be waived by the Architect or testing agency if field experience indicates evidence of satisfactory strength.
- B. The testing laboratory employed by the Owner shall report test results, in writing, to the Architect, the Owner, Contractor and concrete producer on same day tests are made.

- C. The Contractor shall give 48 hours prior notice to the testing laboratory employed by the Owner of his intention to place concrete.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.06 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Architect.
- B. Mix dry-pack mortar, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
 - 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 - 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 - 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and

finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

- F. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Architect.

3.07 SCHEDULE OF CONCRETE SURFACES:

- A. Coordinate with Documents and Finish Schedules for finish material to be placed on concrete flatwork and prepare surface accordingly.
 - 1. Seal all interior exposed concrete slabs.

END OF SECTION 03300

SECTION 04050 - MASONRY PROCEDURES**PART 1 – GENERAL****1.01 WORK INCLUDED:**

- A. All masonry installations shall conform to the **Brick Industry Association – Technical Notes** for best practices which shall be considered the standard for all installations.
- B. **All masonry construction shall conform to the minimum specification and performance requirements herein noted and should be coordinated with sections and details for additional information.** Details may not show all of the materials herein required.
- C. Installation Procedures of all types of masonry units specified elsewhere.
- D. Installation Requirements of misc. masonry accessories specified in Divs. 4 & 7, and other material specified in other Divisions of these specifications.
- E. Coordination between masonry and other equipment which may be installed in the masonry, or require masonry openings.
- F. **See Section 04150 – Masonry Accessories for masonry cleaning materials and procedures.**
- G. **See Section 07600 – Sheet Metal Flashings and Trim for other flashing work specified therein that might be included for installation in the work of this Section.**

1.02 GENERAL REQUIREMENTS:

- A. Coordinate with all special masonry shapes and different kinds of masonry that shall be installed in this Project.
- B. Coordinate with the Mechanical and Electrical trade Contractors for equipment that may need masonry openings, mounting or other consideration that may affect the masonry installation.
- C. Coordinate with the structural Documents for lintels and beams over proposed masonry openings to determine if steel or masonry lintels are required.
- D. Fire Ratings: Fire rated concrete masonry units shall be in compliance when:
 - 1. The CMU has been certified through the equivalent thickness method contained in Chapter 3 of ACI 216.1.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 04100 – Mortar and Grout.
- B. Section 04150 - Masonry Accessories.
- C. Section 04200 – Concrete Masonry Units
- D. Section 07200 - Insulation.
- E. Section 07260 – Vapor Retarders
- F. Section 07600 – Sheet Metal Flashing and Trim.
- G. Section 07900 - Joint Sealants.
- H. Section 09300 - Tile.
- I. Section 09900 - Painting.

1.04 QUALITY ASSURANCE:

- A. **Refer to Brick Industry Association – Technical Notes for additional information, procedures standards for the installation of masonry units and the proper detailing of masonry systems - typical.**
- B. Single source responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product relied for each continuous surface or visually related surfaces.
- C. Single Source responsibility for Mortar Materials: Obtain Mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- D. Temporary Bracing: Comply with Mason Contractors Association of America's Standard Practice for Bracing Masonry Walls Under Construction, and Masonry Wall Bracing Design Handbook, published by the Masonry Contractors Association of America.

1.05 INCONSISTENCIES:

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS2.01 MATERIAL:

- A. See **other** Masonry Sections in this Specification for all material and products associated with Masonry Installations and related herein to the Masonry Procedures and Instructions that follow.

PART 3 - EXECUTION3.01 ENVIRONMENTAL REQUIREMENTS:

- A. Cold weather requirements: IMIAC-Recommended Practices and Guide Specifications for Cold Weather Masonry Construction. When the mean daily temperature falls below 40°F follow the cold weather requirements specified below. Prior to implementation of these procedures, conduct a meeting of all involved parties to detail the practical institution of these requirements.
- B. On bearing surfaces covered with ice or snow, apply heat to surfaces until surfaces are dry. Remove previously installed masonry damaged due to cold weather.
- C. Install dry masonry units that are at least 20°F. If specifically approved by the Engineer, use Type III Portland cement and/or mortar setting. Use mortar at a temperature of between 40°F and 120°F. If possible, use 70°F mortar. Mix mortar so that successive batches vary in temperature by no more than 30 degree F.
- D. Air temperature 40°F to 32°F heat sand or mixing water to achieve specified mortar temperature at point of use.
- E. Air temperature 32° F to 25° F:
 - 1. Heat sand and mixing water to at least 50°F. prior to mixing. Provide continuous auxiliary heat to mortar boards as necessary to ensure specified mortar temperature at point of use.

3.02 INSTALLATION – GENERAL:

- A. Wetting Clay Brick: Wet brick made from clay or shale which has ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure each clay masonry unit being nearly saturated but surface dry when laid.
- B. Do not wet concrete masonry units.
- C. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coating from reinforcing.
- D. Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness show. Build single-wythe walls to the actual thickness of the masonry units, using the nominal thickness of the material.
- E. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- F. Cut masonry units using motor-driven saws. Use dry cutting saws to cut concrete masonry units.
- G. Matching Existing Masonry Work: Match coursing, bonding, color and texture of new masonry work with existing. Tooth masonry infill into existing masonry coursing.
- H. **Bond Break: Provide a continuous bond breaker strip in all mortar joints between clay masonry and concrete masonry.**

3.03 CONSTRUCTION TOLERANCES:

- A. **Variations from Plumb:** For vertical lines and surfaces of columns, walls and arises do not exceed ¼" in 10' or 3/8" in a story height not to exceed 20'. For exterior corners, expansion

- joints, control joints and other conspicuous lines do not exceed $\frac{1}{4}$ " in any story or 20' maximum.
- B. **Variations from Level:** For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed $\frac{1}{4}$ " in any bay or 20' maximum.
 - C. **Variation of Linear Building Line:** For position shown in plan and related portion of columns, walls and partitions, do not exceed $\frac{1}{2}$ " in any bay or 20' maximum.
 - D. **Variations in Cross-Sectional Dimensions:** For columns and thickness of walls, from dimensions shown, do not exceed minus $\frac{1}{4}$ " nor plus $\frac{1}{2}$ ".
 - E. **Variations in Mortar Joint Thickness:** Do not exceed bed joint thickness indicated by more than plus or minus $\frac{1}{8}$ ". Do not exceed head joint thickness indicated by more than plus or minus $\frac{1}{8}$ ". Use special lengths of masonry units, or coordinate with Architect for masonry construction that does not allow head joints to align or remain a constant width.

3.04 LAYING MASONRY WALLS:

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less than $\frac{1}{2}$ size units at corners, jambs whenever possible.
- B. Pattern Bond: Lay exposed masonry in the bond pattern shown or, if not shown, lay in running bond with vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2". Do not use units with less than nominal 4" horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Rack back $\frac{1}{2}$ unit lengths in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly and remove loose masonry units and mortar prior to laying fresh masonry.
- D. Built-in Work: As the Work progresses, build-in items specified under this and other sections of these specification. Fill in solidly with masonry around built-in items.
 - 1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
 - 2. Where build-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
 - 3. Fill cores in hollow concrete masonry units with grout 3 courses (24") under bearing plated, beams, lintels, posts and similar items.
- E. Masonry walls indicated to extend to the roof deck shall terminate 1" below the underside if the deck - typical.
 - 1. Maintain fire-rated separations required by filling resulting space with a firestop joint assembly suitable for permanent placement – as required to maintain rating.
 - 2. Coordinate with Architectural Details for masonry termination at decks above, or at a minimum:
 - a. Provide a continuous 16 ga. track to receive masonry when running perpendicular to deck flutes.
 - b. Where masonry wall is parallel to deck flutes, provide a supplemental 12 ga. plate to link flutes and provide attachment for metal track.

3.05 MORTAR BEDDING AND JOINTING:

- A. Lay solid brick size masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footing and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- C. Maintain joints widths shown, except for minor variations required to maintain bond alignment. If not indicated – all joints shall be $\frac{3}{8}$ ".
- D. **Tool exposed joints slightly concave for brick and slightly concave for block including scored joint using a jointer larger than joint thickness, unless otherwise noted.**

- E. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.
- F. Set stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes
 - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 - 2. Wet joint surfaces thoroughly before applying mortar.
- G. For all conditions receiving a vapor/air barrier membrane application all masonry joints shall be struck flush with full mortar bed.

3.06 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY:

- A. Use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes. Install at not more than 16" OC vertically.
 - 1. For horizontally reinforced masonry, provide continuity at corners with prefabricated "L" units, in addition to masonry bonding.
- B. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:
 - 1. Provide individual metal ties at not more than 24" OC vertically.
 - 2. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.

3.07 HORIZONTAL JOINT REINFORCEMENT:

- A. General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6".
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.

3.08 ANCHORING MASONRY WORK:

- A. General: Provide anchor devices typical of material being installed, or of type specified.
 - 1. Anchor masonry to structural members where masonry abuts or faces structural members.
 - 2. Provide and install reinforcing to anchor masonry at, or very near, any termination points.
 - 3. **Anchors shall be at a maximum of 6" from masonry termination so as to provide stability to entire masonry surface.**
- B. **See additional Specification Sections for additional anchor/reinforcing requirements for cast-stone, stone or other special masonry.**

3.09 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 temporary loads that may be placed on them during construction.
- B. Place Reinforcement: Comply with requirements in Michigan Building Code.
- 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 Michigan Building Code 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".

3.10 CONTROL AND EXPANSION JOINTS:

- A. Refer to Section 04200 – Concrete Unit Masonry and Section 04210 – Brick Veneer Masonry for additional information on Control/Expansion Joints.
- B. Provide a brick expansion joint and/or a block control joint within 32" of a corner of masonry construction where the wall length in either direction is in excess of 24 feet. Provide a joint in-line with normal head coursing (cut brick as required) and provide backer-rod and sealant as noted elsewhere in this Specification.
- C. General: Provide vertical and horizontal expansion, control and isolation joints in masonry where shown on Documents, specified in other Sections of these Specifications, or as recommended by the Masonry Institute and the Brick Industry Association.

3.11 MASONRY LINTELS:

- A. Provide lintels where shown and wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.
- C. Provide a bond-breaker at bearing planes of all loose, steel lintels to allow for expansion of lintels in the mortar bed. Provide an expansion material at the end of each steel lintel to fill expansion void and accept sealants.
- D. Coordinate with Documents for whether the lintels are steel or masonry according to a Lintel Schedule or Details. **It is the contractor's responsibility that all openings shall be coordinated to have an appropriate lintel.**
- E. Provide weep holes consistent with details described elsewhere in these Specifications above all steel lintel conditions. Coordinate weep holes with flashing requirements above all lintels.

3.12 REPAIR, POINTING AND CLEANING:

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or gout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.
- C. Final Cleaning: After mortar is thoroughly set and cored, clean masonry as follows:
 - 1. Coordinate with Section 04150 – Masonry Accessories for additional information concerning masonry cleaning material and procedures.
 - 2. Cleaning methods shall be appropriate for each type of brick or other masonry material encountered and shall be non-injurious to said material. Cleaning methods shall be in accordance with Brick Institute of America Technical Notes 20 and comply with best industry standards and practices.
 - 3. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 - 4. Acid cleaning and abrasive cleaning methods will not be permitted.
 - 5. Perform pressurized water jet cleaning (no cleaning solution) at the lowest effective pressures method. If high pressures are required, use a fan-type hose tip of no less than 20 degrees to avoid damage to masonry.
 - 6. Test cleaning methods on sample wall panel; leave ½ panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 7. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water. Use:
 - a. Detergent
 - b. Acidic cleaner; apply in compliance with directions of cleaner manufacturer.
 - 8. Clean stone trim to comply with stone supplier's written instructions.
 - a. Clean limestone units to comply with recommendations in "Indiana limestone Handbook".

9. Protection: Provide final protection and maintain conditions in a manner acceptable to Installer, which ensures unit masonry work being without damage and deterioration at them of substantial completion.

END OF SECTION - 04050

SECTION 04100 - MORTAR and GROUT**PART 1 - GENERAL**

- 1.01 **WORK INCLUDED:**
- A. Mortar for Masonry Joints
 - B. Mortar for masonry bedding
 - C. Grout for filling masonry cores and voids.
 - D. Leveling Beds for Non-Specific Structural Applications
- 1.02 **RELATED WORK SPECIFIED ELSEWHERE:**
- A. Section 03300 – Concrete Work
 - B. Section 04050 - Masonry Procedures
 - C. Section 04200 – Concrete Unit Masonry
 - D. Section 09250 – Gypsum Drywall Systems
- 1.03 **REFERENCE STANDARDS:**
- A. ASTM C-5 - Quicklime for Structural Purposes
 - B. ASTM C-91 - Masonry Cement
 - C. ASTM C 94 – Ready-mix Concrete
 - D. ASTM C-144 - Aggregate for Masonry Mortar
 - E. ASTM C-150 - Portland Cement
 - F. ASTM C-207 - Hydrated Lime for Masonry Purposes.
 - G. ASTM C-270 - Mortar for Unit Masonry
 - H. ASTM C 404 - Aggregates for Masonry Grout
 - I. ASTM C-476 - Mortar and Grout for Reinforced Masonry
 - J. ASTM C 1329 – Standard Specification for Mortar Cement.
 - K. NCMA TR-88 – Hot and Cold Weather Masonry Construction Manual
- 1.04 **SUBMITTALS:**
- A. Product Data: Submit certified test reports showing that the cementitious components of the mortar mix comply with the specified requirements.
 - B. Submit two samples illustrating mortar color and range.
 - C. Submit manufacturer's instructions.
- 1.05 **QUALITY ASSURANCE:**
- A. Coordinate with Section 01400 – Field Engineering and Quality Control for additional requirements.
 - B. When required by local ordinance or by the Engineer, prepare mortar prisms for strength testing and test them to verify compliance with these specifications.
- 1.06 **ENVIRONMENTAL REQUIRMENTS:**
- A. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).
 - B. Hot Weather Requirements: Comply with IMIAWC (HW)

PART 2 - PRODUCTS

- 2.01 **MORTAR MATERIALS:**
- A. Portland cement: ASTM C-150, Type I - Normal, except Type III may be used for cold weather.
 - 1. Provide natural color cement as required to produce required mortar colors noted below.
 - B. Masonry Cement: shall comply with ASTM C-91, Type N typical, *or Types S and/or M as required for special conditions – see Installation required below.*
 - C. Hydrated Lime: ASTM C-207, Type S (where required).
 - D. Quicklime: ASTM C-5, non-hydraulic type (where required).

- E. Water: Potable, clean and free from injurious amounts of oil, alkali, acids, organic materials.
- F. Mortar Aggregate: Natural, or as manufactured sand, meeting ASTM C-144.
- G. Grout Aggregate: ASTM C-404.
- H. Admixtures: Avoid use of accelerants and admixtures (other than colorants) if possible. All Admixtures shall be submitted and authorized by the Architect prior to application.
 - 1. Comply with ASTM C1384
 - 2. When using a bond enhancer admixture, do not use an air-entraining agent.
 - 3. Accelerating Admixture: Nonchloride type of use in cold weather
- I. Bonding Agent: Multi-Purpose, Acrylic Latex type. Use per manufacturer's instruction, and only as required for field conditions.

2.02 MASONRY CEMENT MORTAR:

- A. Masonry Cement Mortar for Unit Masonry - per ASTM C 270 per system below, unless special conditions are encountered. **Refer to Brick Industry, Technical Notes 8B for additional information.** Typical classifications of mortar mix - for use in various applications are noted below:
 - 1. **Type S Mortar:** Mix to the Property Specifications of ASTM C 270:
 - a. Compressive Strength: 1800 psi, min., at 28 days for laboratory mixed mortar with a flow of 110 plus/minus 5%.
 - b. Water Retention: 75%, Min.
 - c. Air Content: 12% Max.
 - d. Aggregate Ratio: No less than 2.25 and no more than 3.5 time the sum of the separate volumes of cementitious materials.
 - 2. **Type N Mortar:** Mix to the Property Specifications of ASTM C 270:
 - a. Compressive Strength: 750 psi, min., at 28 days for laboratory mixed mortar with a flow of 110 plus/minus 5%.
 - b. Water Retention: 75%, Min.
 - c. Air Content: 14%, Max.
 - d. Aggregate Ratio: No less than 2.25 and no more than 3.5 times the sum of the separate volumes of cementitious materials.
 - 3. **Masonry Mortar Mix:** Factory blended masonry cement sand mix proportioned to produce masonry mortar complying with the property specifications in ASTM C 270 for the specified type of masonry mortar.
 - a. Masonry Cement: ASTM C 91, Type M
 - b. Masonry Cement: ASTM C 91, Type S
 - c. Masonry Cement: ASTM C 91, Type N
 - d. Sand: Mason's sand, ASTM C 144
- B. **Typical Mortar Applications shall follow BIA recommendations – unless noted otherwise – similar to:**
 - 1. At or below grade: Use Type M
 - 2. For all Stone Work, interior or exterior: Use Type M
 - 3. Exterior above grade:
 - a. Reinforced or loadbearing walls: Use Type S.
 - b. Veneer or non-loadbearing walls: Use Type N.
 - 4. Interiors:
 - a. loadbearing walls: Use Type M
 - b. Partitions: Use Type N
 - 5. Pointing mortar: Use Type N with maximum 2% ammonium stearate or calcium stearate per cement weight
- C. Typical mortar characteristics for information only:
 - 1. Type N mortar - General all-purpose mortar with good bonding capabilities and workability
 - 2. Type S mortar - General all-purpose mortar with higher flexural bond strength
 - 3. Type M mortar - High compressive-strength mortar, but not very workable
 - 4. Type O mortar - Low-strength mortar, used mostly for interior applications and restoration

2.03 GROUT MIXES:

- A. Comply with ASTM C 476, slump of 8 to 10 inches measured per ASTM C 143.
 - 1. Provide fine or coarse grout per ACI 530/ASCE 5/TMS 402, Table 1.15.1, Grout Space Requirements, based upon height and CMU cell size.
 - 2. ASTM C 476 grout mix shall be determined by the following method:
 - a. By specified compressive strength tested in accordance ASTM C 1019, minimum compressive strength of 2,000 psi. – unless noted otherwise.
- B. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10" slump; provide premixed type in accordance with ASTM C 94 – unless noted otherwise in Structural Documents
 - 1. Fine grout for spaces with smallest horizontal dimension of 2" or less.
 - 2. Coarse grout for spaces with smallest horizontal dimension greater than 2".

PART 3 - EXECUTION3.01 MIXING OF GROUT and MORTAR:

- A. Mixing of grout (and mortar) shall be done in a mechanical batch mixer, in which all cementitious material shall be mixed for at least 5 minutes with the maximum amount of water. Hand mixing for small jobs is not permitted without the Architect's permission.
- B. Grout (and mortar) shall be used within 2 hours after mixing when air temperature is 80°F, or higher, and within 3-1/2 hours when air temperature is less than 80°F. Retempering during this time to replace water lost by evaporation will be allowed.
- C. Maintain sand uniformly damp immediately before the mixing process.
- D. Mix mortar ingredients in accordance with ASTM C 270.

3.02 SPECIAL INSTALLATION:

- A. Placing of mortar and tooling of joints is additionally described in Sections 04050 and 04200.

3.03 GROUTING:

- A. Grout Placement – normal lift; subject to the Contract Documents and Masonry Institute's recommendations:
 - 1. Place grout within 1-1/2 hours from mixing and prior to initial set of grout.
 - 2. Do not exceed the grout pour heights of ACI 530.1/ASCE 6/TMS 602.
 - 3. Place grout in lifts not exceeding 5 feet high.
 - a. If there is a significant delay, stop grout minimum of 1-1/2 inches below the top of masonry to form a shear key with the next lift.
 - 4. Consolidate grout at time of placement for pours of 12 inches or less by mechanical vibration or puddling.
 - 5. Consolidate grout at time of placement for pours exceeding 12 inches by mechanical vibration and reconsolidate by mechanical vibration while grout is still plastic.
 - 6. Solidly fill cells below lintel or beam bearing minimum of 24 inches high.
 - 7. Bond Beams and Masonry Lintels:
 - a. Allow masonry lintels to attain sufficient strength to support loads imposed during construction before removing temporary supports.
 - 8. Alternatively, place masonry units and grout using construction procedures employed in the accepted grout demonstration panel..
- B. Low-lifting Grouting:
 - 1. Limit height of pours to 12".
 - 2. Limit height of masonry to 16" above each pour.
 - 3. Pour grout only after vertical reinforcing is in place; place horizontal reinforcing as grout is poured. Prevent displacement of bars as grout is poured.
 - 4. Place grout for each pour continuously and consolidate immediately; do not interrupt pours for more than 1-1/2 hours.

END OF SECTION - 04100

SECTION 04150 - MASONRY ACCESSORIES**PART 1 - GENERAL****1.01 WORK INCLUDED:**

- A. **All masonry construction and accessories shall conform to the minimum specification and performance requirements herein noted and should be coordinated with individual Spec. Sections and details for additional requirements.**
- B. **Each Architectural Detail may not specifically note all of the materials herein specified but they are required by this reference in all masonry assemblies.**
- C. Horizontal wire reinforcing or adjustable wire reinforcing as required by individual details/conditions. Masonry veneer reinforcement material and systems. Steel bar reinforcing
- D. Anchors, ties, dowels and other miscellaneous metal accessories
- E. Masonry systems - concealed and/or exposed Flashings – flexible and/or fixed.
- F. Misc. accessories
- G. Masonry and cast-concrete admixtures

1.02 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.
- B. Specifications as supported by the Masonry Reinforcing Corporation of America.
- C. Coordinate with Section 04050 – Masonry Accessories for requirements of installation regarding materials herein specified.
- D. Coordinate with Section 04200 – Concrete Masonry Units for Schedule of Reinforcing in concrete masonry unit wall construction – if not typical as noted in Section 04050 – Masonry Procedures.
- E. Coordinate with Section 04210 – Brick Veneer Masonry for Product material to be installed with accessories for this Section.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 04050 – Masonry Procedures
- B. Section 04100 – Mortar and Grout
- C. Section 04200 – Concrete Unit Masonry
- D. Section 07200 - Insulation.
- E. Section 07600 – Flexible Sheet Flashing and Trim
- F. Section 07900 - Joint Sealants.

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's product literature and certification for all masonry accessories demonstrating compliance with specified requirements.
- B. Shop Drawings: Submit shop drawings for all masonry reinforcing bars.

PART 2 - PRODUCTS**2.01 STEEL BAR REINFORCING:**

- A. Standards: Reinforcing shall conform to ASTM A-615, Grade 60 for deformed bars for masonry construction.
- B. See Drawings for additional information or requirements of steel reinforcement.
- C. See Section 04200 for Concrete Masonry Unit reinforcing Schedule.
- D. See Section 03300 for additional requirements.

2.02 WIRE GAUGE REINFORCING:

- A. Standards:

1. Reinforcing shall conform to ASTM A82 for uncoated wire and with ASTM A153, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating (galvanized) applied after prefabrication into units.
 - a. **Applications requiring hot-dipped galvanizing** - masonry exposed to weather, in exterior applications, or in contact with earth.
 - b. **Applications allowing mill galvanizing** - zinc coating (0.10 oz. per sq. ft.) applied after fabrication into units: Interior masonry construction in walls whose environments shall be less than 75% relative humidity during occupancy.
 2. **Provide specialized anchors for stone and cast-concrete shapes, as required, to perform as reinforcing as required and specified in Section 04050 – Masonry Procedures.**
- B. Single-wythe Design:
1. Ladder Type with cross rods spaced not more than 16" o.c. for single wythe wall reinforcement.
 2. Prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10'.
- C. Flexible Anchors: Where flexible anchors are required for connecting masonry to structural framework, provide 2-piece anchors that permit vertical or horizontal differential movement between wall and framework parallel to, but resist tension and compression forces perpendicular to plane of wall.
1. For anchorage to steel framework provide manufacturer's standard anchors which fasten thru exterior sheathing and extend thru rigid insulation to steel framing, or back-up metal stud framing.
 2. Wire size: 0.1875 diameter min.
- D. Width - Size: Two inches less than nominal, overall thickness of wall.
- E. Rod Size: Deformed longitudinal side rods 9 gauge (3/16" – heavy) and cross rods to be 9 gauge wires unless noted otherwise.
- F. Cross Rods: Cross rods that serve as metal tie in exterior cavity and other multi-wythe walls shall be galvanized and drip crimped.
- G. Corners and Tee Sections: Prefabricated of material and design similar to main reinforcement.
- H. Approved reinforcing Manufacturers:
1. Dur-O-Wal Manufacturing Co.
 2. Heckmann Building Products, Inc.
 3. Hohmann & Barnard, Inc.
 4. Wire-Bond
 5. or Architect/Engineer approved substitution.

2.03 ANCHOR AND TIE SYSTEMS:

- A. **See Section 04050 – Masonry Procedures for additional reinforcing requirements.**
- B. Masonry to Structural Framework: Provide 2-piece anchors consisting of anchored rod (or plate) and triangular wire-tie with vertical movement, size to extend within 3/4" of face of outside of masonry veneer. Choose attachment and anchoring procedures based on structural material and cavity insulation material.
 1. Provide anchors at 16" centers vertically and at each location of metal stud framing (typically @ 16-24" OC) – unless noted otherwise. Always attach anchors through sheathing into metal framing.
 2. Adjustable veneer anchor, steel to masonry – type RJ-711 (screw attached to steel) or Type III anchor (weld attached to steel). Hot dip galvanized for exterior applications. Mill galvanized for interior applications.
 - a. Plates shall be 12 or 14 ga.
 - b. Wire is 3/16" diameter. Hook lengths as required for wall design.
 - c. Column and beam anchors – 1/8" thick x 2" wide x required length. Finished as required for application
- C. Masonry to Wood Structural Framework: Provide a 22 gauge corrugated wall tie, hot dip per ASTM A 153 spaced at 24" o.c horiz. and 16" oc. vertically. Additional ties at 12" spacing around openings. Attach with 8d hot dip nails.

- D. Masonry to Masonry: Provide ladder-type reinforcing with integral composite adjustable tabs @ 16" O/C for brick veneer and concrete block backup. For intersecting block walls which are not bonded in masonry, bond and use 1/4" x 2 1/4" wide "Z"-shaped ties with galvanized finish at 16" on center vertically and 16" horizontally – unless noted otherwise.
- E. Approved masonry connector manufacturers:
 - 1. Fero Corp.
 - 2. Simpson Strong-Tie (Strong Frame – moment frame)
 - 3. Dur-O-Wal Manufacturing Co.
 - 4. Heckmann Building Products, Inc.
 - 5. Hohmann & Barnard, Inc.
 - 6. or Architect/Engineer approved substitution.

2.04 MASONRY SYSTEM DRIP & FLASHINGS:

- A. Metal Drip-edges:
 - 1. **Install a metal drip-edge in typical thru-wall flashing installations – unless noted otherwise. Coordinate the metal drip-edge selections herein, with the choice of thru-wall flashing/membranes below.**
 - 2. Drip-edge Material:
 - a. Stainless steel - meeting ASTM A167, Type 304,
 - 3. Metal Configuration: Extend at least 3 inches horizontally into wall and 1/2 inch out from exterior face of wall with outer edge bent down 30 degrees and hemmed.
 - 4. Corners: all corners and terminations shall be clipped to eliminate sharp points and shall have a bead of silicone applied to cut seam to protect from sharp edges.
 - 5. **Provide a splice-metal section, at least 6" long x depth of drip-edge to allow hemmed edge of drip-edge to be formed around – which will align the adjacent sections of metal drip-edge. This shall be typical for all running, butt joints in drip-edge material.**
 - 6. Sealant: One-part non-skinning butyl sealant conforming to ASTM C 1085.
- B. **Thru-wall, flexible membrane flashing:** For membrane flashing not exposed to the exterior, or as a composite part with a metal drip-edge flashing system, **provide one of the following:**
 - 1. Bituthene Sheet Flashing (rubberized asphalt), as thru-wall flashing: Flexible sheet flashing especially formulated from modified bituthene flexible and waterproof in concealed masonry applications, black in color and of thickness indicated below:
 - a. Thickness: 40 mils
 - b. Material: Cold-applied self-adhesive sheet of rubberized asphalt integrally bonded to an 8 mil, high-density, cross-laminated polyethylene film.
 - c. Manufacturer: W.R. Grace & Co., or equal.
 - d. **Provide metal drip under flexible sheet flashing at lintels – typical, and where indicated. See Above.**
 - e. Form end dams at lintel ends.
 - 2. EPDM Flashing:
 - a. per ASTM D 4637, ethylene-propylene-diene terpolymer
 - b. 40 mil thick
 - c. Exposed edge metal: **See Above**
 - 3. Elastomeric Thermoplastic Flashing:
 - a. Composite of rubberized-asphalt adhesive, 0.025 inch thick, bonded to a polyester-reinforced ethylene interpolymer alloy.
 - b. Exposed edge metal: **See Above**
- C. Provide Adhesives, Primers, and Seam Tapes for Flexible Membrane Flashings as required by the material and coordinated with manufacturer's requirements.

2.05 MISCELLANEOUS ACCESSORIES:

- A. Reinforcement Retaining Clip: extruded rigid polyvinyl chloride (PVC), with one retaining ridge to secure 9 gauge wire, and three retaining ridges to secure 3/16" diameter wire, grooved base for improved mortar bond.

- B. Compressible Filler: Filler strips conforming to ASTM D 1056, Class 2A1, 25% oversized in thickness. Width shall match the masonry wythe minus 1/2 inch.
- C. Preformed Control Joint Gasket: ASTM D 2000, BC810, Designation M2AA-805, or complying with ASTM D 2287, Type PVC-654-4, formed with shear key to fit into sash block ends.
- D. Joint Reinforcement Wire:
 - 1. Wire size: 3/16", galvanized wire.
 - 2. Length: 10 feet minimum continuous piece length.
- E. Bond Breaker Strips: Asphalt-saturated organic roofing felt per ASTM D 226, Type I.
- F. Steel Column Isolation Material: 1/2" thickness asphalt impregnated fiber board.
- G. Control joints:
 - 1. Extruded PVC compound with 80 durometer hardness conforming to ASTM D 2240. Control joints shall occur at 30 feet intervals (max.), and singularly at each exterior masonry corner. Refer to details for additional information or spacing requirements.
 - 2. Additional Control Joint details may be allowed per the Structural Documents. The Contractor has the option of any method shown.
- H. Grout Stop:
 - 1. Non-corrosive 1/4" square polypropylene monofilament screening, in widths to match material, allowing proper bonding while preventing grout from falling through block cores.

2.06 WATERPROOFING MATERIAL:

- A. **All cast-concrete units installed as exterior sill or caps shall have an integral water-repellent admixture used during production.**
- B. Provide **Integral** CMU Water-Repellent similar to the following product:
 - 1. Product type 1: Integral **liquid polymeric** admixture mixed with concrete during production of cast-stone and other Concrete Masonry Units to achieve water repellency. As Manufactured by:
 - a. DRY-BLOCK – by W.R. Grace Construction Products.
 - b. RainBloc – by ACM Chemistries.
 - c. or Approved equal
 - 2. Product type 2: admixture mixed with concrete during production of cast-stone and other CMU's that generates a **non-soluble crystalline** formation throughout the concrete to achieve water repellency throughout the depth of material. As Manufactured by: Admix C-1000 by Xypex
 - b. Hycrete W1000 by Hycrete
 - c. or Approved equal
 - 3. Coordinate with Section 07190 for installation of a complete system.

2.07 SEALANTS:

- A. When providing an integral admixture to the block or cast-stone also provide an admixture to the mortar as a system application for waterproofing masonry construction. See Section 04100 – Mortar and Grout for additional information.
 - 1. Similar to 'Dry-Block mortar admixture' by Grace Masonry Products - integral liquid polymeric admixture for mortar added during mixing.
- B. Water Permeance of Masonry: Capable of achieving a Class E Rating when evaluated using ASTM E 514 with the test extended to 72 hours, using the rating criteria specified in ASTM E 514-74.
- C. Provide an integral water repellent admixture for all cast-concrete units **and for mortar** associated with these units when used in a sill or cap/coping installation and as further indicated in these Documents.

PART 3 - EXECUTION

3.01 INSTALLATION OF REINFORCING:

- A. If not otherwise indicated on the Drawings, install wire gauge masonry reinforcing in horizontal joints of concrete block walls at a spacing of not more than 16 inches apart vertically to coincide with brick and block coursing.
- B. Install wire gauge reinforcing so that it is completely embedded in mortar or grout. Joints with wire gauge reinforcing shall be provided in accordance with ACI-530 (latest edition). Where continuous wire gauge reinforcing is called for, lap reinforcing 12" min. and install corner and intersection assemblies to provide complete reinforcement of the horizontal masonry joint at that elevation. Tie corner-reinforcing units to straight wall units.
- C. Lap reinforcing bars in accordance with ACI-530 (latest edition), a minimum of 48 bar diameters and not less than 24" where spliced. Separate lapping bars by at least one bar diameter or 1" (whichever is greater), or wire together. Lap horizontal joint reinforcing 24" where spliced. Use preformed corners and sections.
- D. Unless otherwise indicated on Drawings, place reinforcing bars so that they have a minimum clearance of 1/4" from adjacent masonry and meet all spacing requirements of ACI-530 (latest edition). Use corner bars for continuous horizontal reinforcing at corners. Dowel vertical reinforcing from footing to match vertical reinforcing size and location.
- E. Secure rigid insulation in place with rigid insulation retainer at each masonry wall tie connector location on horizontal joint reinforcement.

3.02 INSTALLATION OF ANCHOR AND TIE SYSTEMS:

- A. Install metal ties with maximum spacing of 16" on center vertically, and 16" on center horizontally for brick veneers and 32" on center horizontally for block wythes, unless noted otherwise. Coordinate with structural requirements – if noted.
- B. Provide additional ties within 12" of all masonry openings.
- C. Provide anchor/reinforcing spaced as noted above with the requirement to have an anchor for every 2 SF at a maximum.
- D. Extend reinforcement a minimum of 8" past masonry jamb openings, and 1 course above each opening.
- E. Provide and install reinforcing to anchor masonry at, or very near, any termination points. Anchors shall be at a maximum of 6" from masonry termination so as to provide stability to entire masonry surface.

3.03 REFER TO SECTION 04050 – MASONRY PROCEDURES FOR ADDITIONAL REQUIREMENTS

END OF SECTION 04150

SECTION 04200 - CONCRETE UNIT MASONRY**PART 1 - GENERAL****1.01 WORK INCLUDED:**

- A. Standard concrete masonry units.
- B. Concrete masonry: reinforcing, anchorage and accessories
- C. Cast Concrete decorative units.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 04050 - Masonry Procedures
- B. Section 04100 – Mortar and Grout.
- C. Section 04150 - Masonry Accessories.
- D. Section 04720 – Cast-Concrete-Stone
- E. Division 5 – Metals
- F. Section 07200 - Insulation
- G. Section 07600 – Sheet Metal Flashing and Trim.
- H. Section 07900 - Joint Sealants.
- I. Section 09300 - Tile.
- J. Section 09900 - Painting.

1.03 QUALITY ASSURANCE:

- A. Perform concrete unit masonry work in accordance with requirements of ANSI A41.1, unless indicated otherwise herein.
- B. The Contractor shall submit a notarized affidavit from the block manufacturer certifying that all block are manufactured in compliance with the ASTM standards listed. The affidavit shall also state that blocks will be cured in accordance with one of the methods specified.

1.04 REFERENCE STANDARDS:

- A. As required by BOCA Ch. 17 - Masonry Code: ACI 530-/ASCE 5/TMS 402
- B. ASTM C-33: Concrete Aggregates
- C. ASTM C-331: Lightweight Aggregates for Concrete Masonry Units
- D. ASTM C-90: Hollow Load-Bearing Concrete and Decorative Masonry Units
- E. ASTM C-145: Solid Load-Bearing Concrete Masonry Units
- F. ASTM C-140: Sampling and Testing Concrete Masonry Units
- G. ANSI A41.1: Building Code Requirements for Masonry
- H. Comply with UL and the State of Michigan Fire Marshall requirements for rated construction and corresponding masonry unit classification.
- I. ASTM C129, Type I: Hollow non-load bearing block units.

1.05 SUBMITTALS:

- A. Samples:
 - 3. Cast Stone Sills: Initially, submit (2) sets of manufacturer's full range of standard colors for first selections. Coordinate submittal with schedule to allow for the selection and review of (2) minimum 8" x 8" samples for final approval by Architect/Owner.

1.06 ENVIRONMENTAL REQUIREMENTS:

- A. Refer to Section 04050 for masonry procedures regarding cold weather construction and weather protection.

1.07 PROTECTION:

- A. Do not damage existing surfaces or finishes in the delivery or erection of masonry or preparation of mortar.

- B. Maintain protecting boards at exposed external corners that may be damaged by construction activities. Provide such protection without damaging completed work.

PART 2 - PRODUCTS

2.01 STANDARD, CONCRETE BLOCK UNITS:

- A. Unless otherwise indicated, provide concrete block units with face dimensions 7-5/8" high x 15-5/8" long, actual widths shall be 3/8" less than the nominal dimensions noted on Drawings - typical.
 - 1. Provide all special sizes and shapes noted on Drawings, or as required by these specifications or standard practice for construction. No units with chipped surfaces will be permitted, except where not exposed.
- B. Types of block and characteristics shall be as follows:
 - 1. Hollow load-bearing units shall meet ASTM C-90, Grade N, Type 1. Normal weight unless otherwise indicated.
 - 2. Where required, solid units or special designations for fire resistive walls and partitions shall have a minimum equivalent thickness and corresponding aggregate type determined utilizing the equivalent thickness calculation method as accepted by the Fire Marshal of the State of Michigan. Masonry units shall be supplied that meet the UL classification required for each fire-rated installation in the Work.
 - 3. Solid load-bearing units shall meet ASTM C-145, Grade N, Type 1.

2.02 REINFORCING:

- A. See Section 04150 – Masonry Accessories for all Joint Reinforcing, Ties and Anchoring Devices.
- B. See this Section for a generic Schedule for reinforcing in masonry wall construction.

2.03 CAST 'STONE' CONCRETE UNITS:

- A. Provide a cast concrete unit resembling stone with sizes and profiles as indicated in the Documents.
- B. Provide a zero slump mixture known as Pre-Cast Concrete.
 - 1. Mix design consisting of Portland cement conforming to ASTM C150 with graded and washed natural gravel and sand, crushed limestone, marble granite or quartz conforming to ASTM C33 (as required by texture and color as chosen by the Architect).
 - 2. Coloring pigment conforming to ASTM C979 and admixtures shall be added to achieve desired appearance while maintaining durable physical properties of 4,000 psi min.
 - 3. Exterior surface (or piece) shall have a sloped top to shed water, coped edges and a drip edge below.
 - 4. Sill shall project a minimum of 1" from face of masonry below.
- C. Acceptable Manufacturers: Subject to compliance with requirement, provide cast concrete masonry units by one of the following:
 - 1. Edwards Precast Concrete Co., Dubuque, Iowa
 - 2. Artistic Architecture Corp. 800-383-0603
 - 3. Architectural Molded Composites, Inc. 800-844-7909
 - 4. Or Architect approved substitution under provisions of Section 01600.
- D. Color: As selected by Architect from manufacturer's standard colors which must include, at a minimum, concrete grey, a faux limestone, and black.
- E. **All exterior, concrete-cast sills shall have an integral water-proofing admixture.**

2.04 EXTERIOR NON-LOAD BEARING REINFORCED MASONRY WALL SCHEDULE:

- A. **All exterior load bearing concrete masonry walls will contain horiz. steel reinforcing and vertical reinforcing as noted.** See Structural Drawings for additional information.
- B. The following table shall apply to all exterior **non-load bearing concrete block masonry unit walls** as minimum requirements unless exceeded by drawing requirements.

| Wall Height | CMU Wall Width | Vertical Reinforcement (Full Wall Height) | As = In2/Ln. Ft. | Max. Horiz. Load | Remarks |
|-----------------|----------------|---|------------------|------------------|---|
| 9'-4" | 6" | No Reinforcement | - | 15 psf | |
| 10'-0" - 18'-0" | 6" | #3 @ 32" o/c | 0.0412 | 15 psf | Reinforcing can be elim. If w is supported 10' horiz. along length. |
| 9'-4" | 8" | No Reinforcement | - | 15 psf | |
| 12'-0" | 8" | #4 @ 48" o/c | 0.05 | 20 psf | |
| 16'-0" | 8" | #5 @ 48" o/c | 0.0775 | 25 psf | |
| 16'-0" | 12" | No Reinforcement | - | 25 psf | |
| 20'-0" | 12" | #4 @ 32" or #5 @ 48" o/c | 0.0775 | 32 psf | |

C. Reinforcing Notes:

- The Table above shall be used when no Structural Information is given to the contrary.**
- Assume Design Value $f'm = 1,500$ psi, $F_s = 24,000$ psi, M or S mortar, medium weight CMU.
- CMU wall supported height start from foundation and brace at each floor and/or roof level
- Grout cells solid at vertical reinforcements – full height.
- Increase wall reinforcement at the corner of all walls up to 10'0" horizontally by 50% of scheduled.
- Place two (2) vertical bars of scheduled reinforcement at each side of each masonry opening (door or window) - typical.**

2.05 INTERIOR NON-LOAD BEARING REINFORCED MASONRY WALL SCHEDULE:

- All interior load bearing concrete masonry walls will contain horiz. steel reinforcing and vertical reinforcing as noted.** See Structural Drawings for additional information.
- The following table shall apply to all **interior non-load bearing concrete block masonry unit walls** as minimum requirements unless exceeded by drawing requirements.

| Wall Height Limits | CMU Wall Width | Vertical Reinforcement (Full Wall Height) | As = In2/Ln. Ft. | Remarks |
|--------------------|----------------|---|------------------|---|
| 10'-0" | 6" | No Reinforcement | - | |
| 10'-0" - 18'-0" | 6" | #3 @ 32" o/c | 0.0412 | Reinforcement can be eliminated if wall supported 10' Horizontally. |
| 16'-0" | 8" | No Reinforcement | 0.06 | |
| 20'-0" | 8" | #3 @ 48" o/c | 0.0275 | |
| 24'-0" | 8" | #3 @ 48" o/c | 0.0275 | |
| 22'-8" | 12" | No Reinforcement | 0.0775 | |
| 32'-0" | 12" | #4 @ 72" o/c | 0.0333 | |
| 36'-0" | 12" | #4 @ 64" o/c | 0.0375 | |

C. Typical Requirements:

- The Table above shall be used when no Structural Information is given to the contrary.**
- Assume Design Value $f'm = 1,500$ psi, $F_s = 24,000$ psi, N mortar, light weight CMU.
- All masonry wall design for lateral load = 5 PSF.
- CMU wall supported height start from foundation and brace at each floor and/or roof level
- Grout cells solid at vertical reinforcements – full height.
- Vertical reinforcement to be placed in center of CMU wall UNO.

7. Place two (2) vertical bars of scheduled reinforcement at each side of each masonry opening (door or window) – typical.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Installer must examine the conditions under which the Work of this section is to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.
- B. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION:

- A. Lay out masonry walls on foundation walls, footings, or on concrete floors, coordinating with other trades for piping, conduit or other items stubbed up into the walls.
- B. Consult other trades in advance and make provisions for built-in installation of their work in order to avoid cutting and patching. There are no "extras" for work that requires modification for equipment/material not coordinated prior to block installation.
- C. Coordinate with manufacturer of any water-repellant block admixture for preparations or procedures required for installation.
- D. All masonry block with a "Dry-Block" additive shall be only placed above grade to eliminate hydrostatic pressures from affecting the vapor-barrier integrity.

3.03 ERECTION:

- A. Location of block types:
 - 1. Use hollow load-bearing units for load-bearing walls, partitions, piers, etc.
 - 2. Use blocks meeting fire-resistive rating requirements where indicated on Drawings and where required by applicable codes and regulations.
- B. Lay out walls in advance for accurate spacing of bond patterns, with uniform joint widths and to properly locate openings, control joints, returns and offsets. Lay-up walls plumb and true and with courses level, accurately spaced and coordinated with other work. Avoid use of less-than-half-size units at corners, jambs and wherever possible at other locations.
 - 1. Masonry units shall be laid dry and in a running bond, unless otherwise noted.
- C. Cut masonry units with motor-driven masonry saw. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible.
- D. **Field Control joints:**
 - 1) Provide where located on Drawings.
 - 2) If none shown, provide in accordance with best industry practice and as approved by Architect, and at a **maximum of 28' centers**.
 - 3) Line up control joints with joints in foundation walls and joints in face brick.
 - 4) The joint shall be formed by placing building paper vertically into the open end of a stretcher and alternate half-stretcher block on one side of the joint, then filling the joint with concrete.
 - 5) Leave exposed faces of joints ready for caulking.
 - 6) Isolate masonry construction from structural framing with control joints.
- E. **Corner Control Joints:** Provide a single (1) control joint within 32" horizontally of every masonry corner unless detailed otherwise. Coordinate with Architect for appropriate face of corner unless dictated by best practices. See Section 04050 – Masonry Procedures for additional information.
- F. Grout solid cells containing reinforcing bars in lifts subject to the Contract Documents and Masonry Institute's recommendations. Do not use cell reinforcing to rod grout. At bearing locations for masonry openings, fill masonry cores with grout for a minimum of 12" either side of opening - typical.
- G. Mortar Bedding and Jointing:

1. Do not use mortar that has begun to set, or if more than 2-1/2 hours have elapsed since initial mixing. Retemper mortar during 2-1/2 hour period as required to restore workability.
 2. 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 slush head joints.
 3. Lay hollow CMU with full mortar coverage on horizontal and vertical face sheets; also bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete grout.
 4. Lay CMU units with 3/8" joints - typical. Cut joints flush for concealed work or work to be covered by other materials. Tool joints of exposed CMU work as required by Architect.
 5. During tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of sealant compounds.
 6. Remove masonry units disturbed after laying; clean and re-lay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.
- H. Stopping and Resuming Work:
1. Rake back 1/2 masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry and remove loose masonry units and mortar prior to laying fresh masonry.
- I. Built in Work:
1. As the work progresses, install built-in items specified under this and other sections of these Specifications. Fill in solidly with masonry around built-in items.
 2. Where built-in items are to be embedded in cores of hollow masonry units, place layer of metal lath or horizontal reinforcing in joint below and rod mortar or grout into core.
- J. **Horizontal Joint Reinforcing:**
1. Reinforce horizontal joints of CMU walls with continuous masonry wire reinforcing, spaced 16" o.c. vertically; except spaced 8" o.c. both immediately above lintel and immediately below sill for a distance of 2'-0" beyond jambs of the opening.
 2. Lap reinforcement minimum of 6".
 3. Do not bridge control joints except where specifically noted.

3.04 PROTECTION OF CONSTRUCTION:

- A. Protect partially completed walls and the tops of all walls not enclosed or sheltered using a strong weather resistant cover at the end of each day and at all times when work is not in progress. Drape cover over the wall and extend a minimum of 2 ft. down both sides. Hold securely in place with clamps design for this purpose. Boards placed on top of wall construction are not acceptable
- B. Shoring and Bracing:
1. Provide shoring as required to temporarily support masonry elements such as lintels, beams, arches and soffits. Do not remove until masonry has cured sufficiently to carry its own weight and any other temporary loads that may be placed on it during construction.
 2. Provide temporary lateral bracing as required to support walls and other elements until permanent structural connections are made.
 3. Provide temporary bracing as required for lateral support during grouting and grout curing operations.
- C. Staining:
1. Prevent grout or mortar from staining face of masonry to be exposed or painted. Immediately remove any grout or mortar in contact with face of such masonry.
 2. Turn scaffold boards on edge when work is not in progress to prevent staining of adjacent wall from rain splattering.
 3. Protect base of wall from splattered mud or mortar with covers spread on ground and over wall surface.
- D. Follow procedures for Cold Weather Masonry Construction as spelled out in Section 04050 as temperatures warrant.

3.05 FIELD QUALITY CONTROL:

- A. Texture of block units and size of mortar joints shall be uniform throughout the project. Block with exposed chipped surfaces, or poorly tooled joints are not acceptable. If the wall is unacceptable to the Architect, and when so directed, it shall be the Contractor's responsibility to tear down and replace the block wall.
- B. Tolerances: Max. variation from level - 1/4" in 10 ft.

3.06 CLEANING:

- A. Clean exposed concrete masonry surfaces by dry brushing at end of each day's work and after final pointing to remove mortar spots, stains and droppings. Masonry surfaces to be exposed, either painted or unpainted shall be thoroughly cleaned. Leave surfaces free mortar and other stains.
- B. Regular Concrete Block Masonry: On completion of pointing and re-pointing of all interior and exterior block work exposed to view, clean thoroughly with "SureKlean 600", "Craft Klean", or similar prepared detergent only as expressly recommended by masonry unit manufacturer. Mix and apply in strict accordance with manufacturer's instructions. Test cleaning agent on 20 sq. ft. sample wall area in an inconspicuous area before beginning overall cleaning. Apply cleaner using fiber brushes and non-metallic scrappers, then rinse wall thoroughly with clean water.
 - 1. Job mixed or pre-prepared chemical cleaners containing acid are prohibited.
 - 2. All cleaning shall be done prior to installation of finished floors, wall mounted light fixtures, door hardware, aluminum doors and frames, or other items. Protect any such installed items from damage due to cleaning operations.

END OF SECTION 04200

SECTION 05040 - HOT DIP GALVANIZING**PART I - GENERAL****1.01 WORK INCLUDED**

- A. This specification covers iron and steel materials to be hot dip galvanized after manufacture or fabrication including, but not limited to:
- 1 General Steel Articles.
 - 2 Fabricated Steel Assemblies.
 - 3 Iron and Steel Pipe.
 - 4 Fasteners and Miscellaneous Hardware.
 - 5 Any Ferrous item exposed to the weather.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 05500 – Metal Fabrications
B. Section 05520 – Handrails and Railings

1.03 REFERENCES

- A. Publications:
1. American Galvanizers Association (AGA):
 - a. Inspection of Products Hot Dip Galvanized After Fabrication
 - b. The Design of Products to be Hot Dip Galvanized After Fabrication
 - c. Recommended Details of Galvanized Structures
 2. Research Council on Structural Connections of the Engineering Foundation:
 - a. Specification for Structural Joints Using ASTM-A325 or A490 bolts
- B. Reference Standards:
1. American Society for Testing and Materials (ASTM):
 - b. A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - c. A143 Safeguarding Against Embrittlement of Hot-Dip Galvanized
 - d. Structural Steel Products and Procedure for Detecting Embrittlement
 - e. A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - f. A384 Safeguarding Against Warpage and Distortion During Hot-Dip
 - g. Galvanizing of Steel Articles
 - h. A385 Providing High-Quality Zinc Coatings (Hot-Dip)
 - i. A767 Specification for Zinc-Coated (Hot-Dip Galvanized)
 - j. Steel Bars for Concrete Reinforcement
 - k. A780 Repair of Damaged Hot-Dip Galvanized Coatings
- C. Federal Specifications:
- a. DOD-P-21035, Paint, High Zinc Dust Content, Galvanizing Repair
 - b. MIL-P-26915, Primer Coating, Zinc Dust Pigmented

1.04 QUALITY ASSURANCE

- A. Coating Applicator: Company specializing in hot dip galvanizing after fabrication and following the procedures of the Quality Assurance Manual of the American Galvanizers Association.
- B. Company specializing in DUROZINQ® to assure quality and on time guaranteed delivery.
- C. ISO 9002 Certified within the last five years and audited yearly.

1.05 SUBMITTALS

- A. In accordance with provisions of Section 01300, submit an original and two copies of the coating applicator's Certificate of Compliance that the hot dip galvanized coating meets or exceeds the specified requirements of ASTM-A 123 A767 or A153 (as applicable).
- B. Applicator must submit quality assurance certification and ISO 9002 certification, and auditor's yearly report for the past 3 years.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Store and protect products under the provisions of Section 01610.

- B. Load and store galvanized articles in accordance with accepted industry standards.

PART 2 - PRODUCTS

2.01 ACCEPTABLE COATING APPLICATORS

- A. Applicator must be ISO 9002 certified to assure premier quality standards
- B. American Galvanizing Association members available upon request from the American Galvanizing Association.

2.02 GALVANIZING MATERIALS

- A. Material for galvanizing to be geometrically suitable for galvanizing as described in ASTM-A 384 and A385. Steel materials suitable for galvanizing include structural shapes, pipe, sheet, fabrications and assemblies.
- B. Material to be chemically suitable for galvanizing Steels containing carbon below 0.25 percent, phosphorus below 0.04 percent and manganese below 1.35 percent, either individually or in combination, and providing the silicon content is .04 percent or less or a range of 0.15-0.23%, will normally develop a typical coating when conventional galvanizing techniques are applied. In cases where a steel is selected for considerations other than galvanizing and the chemistry of the elements (C, Mn, P, and Si) exceeds the limits indicated above, the steel may be galvanizable. The galvanizer must be advised of the variation in advance so that he can determine if the material is galvanizable and whether or not special processing techniques will be required or different appearance and bonding is acceptable. Experience has shown that silicon in the ranges of 0.02 to 0.04% and 0.15 to 0.23% produce coatings of normal integrity and performance. Steels with silicon contents significantly below 0.04% may not achieve the desired minimum coating thicknesses. Steel with silicon above 0.23% can have less bonding and adhesion, as well as, a higher milage and dull appearance. Recommended steel materials for hot dip galvanizing include, but are not limited to:

1. Structural shapes and plates: ASTM-A 36, A242 type 2, A283, A441, A500, A501, A529, A572 and A588.
2. Steel for fasteners:

| <u>General Category</u> | <u>Bolt Material</u> | <u>Nut Material</u> |
|---|----------------------|---------------------|
| Carbon Steel | A307 GR A or B | A563 GR A |
| High Strength | A325 Type I | A563 GR DHor |
| Tower Bolts | A394 | A563 GR A |
| Quenched & Tempered Carbon Steel Bolts | A449 | A563 GR C |
| Quenched & Tempered Alloy Steel Bolts | A354 GR BC | A563 GR DH |

CAUTION. Avoid use of steel with an ultimate tensile strength greater than 150 ksi.

2.03 FABRICATION REQUIREMENTS

- A. Fabricate structural steel in accordance with Class (I), (II), (III) guidelines as described in AGA's; Recommended Details for Galvanized Structures.
- B. Fabrication practices for products to be in accordance with the applicable portions of ASTM-A 143, A384, and A385, except as specified herein. Avoid fabrication techniques, which could cause distortion or embrittlement of the steel.
- C. The Fabricator shall consult with Architect/Engineer and Hot Dip Galvanizer regarding potential problems or potential handling problems during the galvanizing process, which may require modification of design before fabrication proceeds.
- D. Remove all welding slag, splatter, anti-splatter compounds and burrs prior to delivery for galvanizing. When weldments are to be galvanized, avoid the use of a high silicon welding rod. (An AGA member can advise on welding rod best suited for architecturally exposed material).
- E. Provide holes and/or lifting lug to facilitate handling during the galvanizing.

- F. Avoid unsuitable marking paints. Use only water-soluble markers. Consult with the galvanizer about removal of grease, oil paint and other deleterious material prior to fabrication.
- G. Remove by blast cleaning or other methods surface contaminants and coatings which would not be removable by the normal chemical cleaning process in the galvanizing operation.
- H. Whenever possible, slip joints should be used to minimize field welding of materials.
- I. To minimize handling damage, trucking to and from the galvanizer must be the responsibility of the galvanizer utilizing galvanizer's company owned truck or by prior written agreement between steel fabricator and galvanizer.

2.04 MATERIALS FOR REPAIRS:

- J. Use a product that meets or exceeds ASTM A-780 (Standard Practice for Repair of Damaged Hot-Dip Galvanized Coatings), with a 95% pure zinc metal as a liquid coating - similar to:
 - 1 Galvilite – Galvanizing Repair Compound By ZRC
 - 2 or equal
- K. Comply with manufacturer's requirements per the application process.
- L. The application may be sprayed, rolled or brushed – at the contractor's option – unless determined otherwise by the Architect.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. Pre-clean steel works in accordance with accepted methods to produce an acceptable surface for quality hot dip galvanizing.

3.02 APPLICATION OF COATING

- A. Galvanize steel members, fabrications, and assemblies after fabrication by the hot dip process in accordance with ASTM-A 123.
- B. Galvanize bolts, nuts, washers, iron and steel hardware components in accordance with ASTM-A 153. For best results this material will be galvanized in a kettle capable of reaching 1000 degrees Fahrenheit.
- C. Safeguard products against steel embrittlement in conformance with ASTM-A 143.
- D. Galvanize reinforcing steel in accordance with ASTM-A 767.
- E. Handle all articles to be galvanized in such a manner as to avoid any mechanical damage and to minimize distortion.
- F. To minimize surface imperfections use of the galvanizing process involving a flux blanket on the kettle (wet method) is prohibited.

3.03 COATING REQUIREMENTS

- A. Coating Weight: conform to paragraph 5.1 of ASTM-A 123, table I of A767, or table I of ASTM-A 153, as appropriate. Special thickness requirements should refer to ASTM-A 123 paragraph 3.1 section 7 and be specified as the minimum average mils of thickness. Extra thick coatings are not always obtainable.
- B. Surface Finish: Continuous, adherent, as smooth and evenly distributed as possible and free from any defect detrimental to the stated end use of the coated article.
- C. Adhesion: Withstand normal handling consistent with the nature and thickness of the coating and normal use of the article.

3.04 TESTS

- A. Inspection and testing of hot dip galvanized coatings shall be done under the guidelines provided in the AGA publication, "Inspection of Products Hot Dip Galvanized after Fabrication".
- B. Include visual examination and tests in accordance with ASTM-A 123, A 767 or A 153 as applicable to determine the thickness of the zinc coating on the metal surface.
- C. Furnish Certificate of Compliance with ASTM Standards and Specifications herein listed. The Certificate must be signed by the galvanizer and contain a detailed description of the

- material processed. The Certificate shall include information as to the ASTM standard used for the coating.
- D. Furnish a detail description as outlined in the Galvanizer ISO 9002 Quality Compliance certification.

3.05 REPAIR FOR DAMAGED COATING

- A. The maximum area to be repaired is defined in accordance with ASTM-A 123 Section 4.6 current edition.
- I. The maximum area to be repaired in the field shall be determined in advance and prior to the start of fabrication by mutual agreement between parties. (galvanizer, fabricator, architect/owner)
- B. Repair areas damaged by welding, flame cutting or during handling, transport or erection by one of the approved methods in accordance with ASTM-A 780 whenever damage exceeds 3/16" in width. Minimum thickness requirements for the repair are those described in ASTM-A 123 section 4. 6 current edition.
- C. **When using the zinc-rich paint method of repair in accordance to ASTM-A 780, the use of aerosol (spray) cans is prohibited. Using a brush applied paint product for touch up of the galvanized surface is the only paint repair acceptable.**

END OF SECTION 05040

SECTION 05520 – HANDRAILS, RAILINGS AND IN-FILL PANELS**PART 1 - GENERAL****1.01. SCOPE OF THE WORK:**

- A. Steel pipe guard railings and handrails
- B. Furnishing and installing all materials, labor and equipment necessary to fabricate and completely install railings and/or guard systems as shown on the drawings or specified herein.
- C. **All handrails and guard systems shall comply with the Michigan Building Code and ANSI A117.1 for all handrail returns and extensions required. See Documents for “Barrier-Free Code Requirements and Typical Mounting Heights and Clearances” diagrams for additional information.**

1.02. RELATED SECTIONS:

- A. Section 03300 – Concrete Work
- B. Section 04050 – Masonry Procedures
- C. Section 04200 – Concrete Unit Masonry
- D. Section 05040 - Galvanizing
- E. Section 05120 - Structural and Miscellaneous Steel
- F. Section 05500 – Metal Fabrications
- G. Section 06100 – Rough Carpentry
- H. Section 06200 - Finish Carpentry
- I. Section 09900 - Painting

1.03. REFERENCES:

- A. ASTM A53 - Hot Dipped, Zinc coated Welded and Seamless Steel Pipe.
- B. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. A 153/A 153M (2001A) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- D. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounded Shapes.
- E. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
- F. ASTM B211 - Aluminum-Alloy Bars, Rods, and Wire
- G. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
- H. ASTM B241 - Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube
- I. ASTM B483 - Aluminum and Aluminum-Alloy Drawn Tubes For General Purpose Applications.
- J. ASTM E935 - Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings
- K. ASTM E985 - Permanent Metal Railing Systems and Rails for Buildings
- L. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.
- M. American Welding Society (AWS):
 - 1. D1.1/D1.1M-10 Structural Welding Code-Steel
- N. ALUMINUM ASSOCIATION (AA)
 - 1. AA 45 (1997) Designation System for Aluminum Finishes
 - 2. ABH-21 Aluminum Brazing Handbook
 - 3. ASD-1 Aluminum Standards and Data
 - 4. DAF-45 Designation System for Aluminum Finishes
 - 5. SAA-46 Standards for Anodized Architectural Aluminum

1.04. QUALITY ASSURANCE:

- A. Work shall be furnished and erected by a single firm to assure undividable responsibility.
- B. Alternate manufacturers for referenced manufacturer's product shall be approved by the Architect by pre-qualifying not less than seven (7) days prior to close of bids.

1.05. DESIGN REQUIREMENTS:

- A. Fabricate railing assemblies, wall rails, and attachments to ASTM E985.
 - B. All guards and handrails systems shall conform to the latest Codes as applicable to heights, extensions, handrail returns and diameters and shall be coordinated with the Documents that indicate intent of the system.
 - C. Structural Performance: Design, engineer, fabricate, and install the following metal fabrications to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each respective component of each metal fabrication.
 - 1. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lb. applied at any point non-concurrently with additional loads, vertically downward, or horizontally.
 - b. Uniform load of 100 lbf applied vertically downward and 50 lb. per foot applied horizontally, applied concurrently.
 - c. Concentrated and uniform loads above shall not act concurrently.
 - 2. Handrails Not Part of Guardrail System: Capable of withstanding the following loads applied as indicated:
 - a. Concentrated load of 200 lbf applied at any point non-concurrently, vertically downward or horizontally.
 - b. Uniform load of 50 lbf applied non-concurrently, vertically downward or horizontally.
 - c. Concentrated and uniform loads above need not be assumed to act concurrently.
- 1.06. SUBMITTALS FOR REVIEW:
- A. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
- 1.07 PRE-INSTALLATION MEETING:
- A. Prior to the beginning of work, conduct a pre-job conference at the job site **and a separate pre-job inspection of fabrication facilities.**
 - B. Provide seven calendar days advance written notice ensuring the attendance by competent authorized representatives of the fabricator, building owner's representative and architect.
 - C. Review the specifications to determine any potential problems, changes, scheduling, unique job site conditions, installation requirements and procedures and any other information pertinent to the installation.
 - D. Record the results of the conference and furnish copies to all participants

PART 2 – RAILING SYSTEM'S PRODUCTS:

2.01 FERROUS METAL RAILING SYSTEMS:

- A. Ferrous Metals Railing components:
 - 1. General: For fabrication of miscellaneous metalwork which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seams, rollermarks, rolled trade names and roughness.
 - 2. Steel tubing: Cold formed, ASTM A500; or hot rolled, ASTM A501 – Grade B typ.
 - 3. Steel pipe - shall meet ASTM A 53:
 - a. Pipe shall be Schedule 40 pipe, "standard pipe" designations - 1-1/2" diameter typical.
 - b. Type and grade as selected by fabricator for particular installation and as required for design loading:
 - 1) Type S (seamless), Grade B (30 ksi), standard weight (Schedule 40), unless another grade, weight, or both required by structural loads.
 - c. Pipe shall be black finish and primed at interior installations only.
 - d. Pipe shall be galvanized and prime finish for all exterior installations, and as noted.
 - e. All pipe diameters shall conform to Barrier-Free requirements.
 - 4. Gray iron castings; ASTM A48, Class 30.
 - 5. Malleable iron castings: ASTM A 47

6. Brackets, flanges and anchors: Cast or formed metal of the same type material and finish as supported steel pipe, unless otherwise indicated.
 7. Concrete inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47 or cast steel, ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.
- B. Fittings:
1. Same material as fastened metal; concealed unless otherwise indicated or unavoidable and standard with systems indicated.
 2. Elbows, T shapes, wall brackets, end caps, escutcheons shall be stamped or cast steel typical.
 3. All connections shall be welded and ground smooth prior to finishing.
- C. Mounting Accessories:
1. Adjustable brackets and flanges, with steel inserts for casting in concrete.
 2. Prepare backing plate for mounting in metal stud wall construction.
- D. Exposed Fasteners:
1. General: provide zinc-coated fasteners for exterior use or where built into exterior construction.
 2. Flush, countersunk screws or bolts; consistent with design of railing.
 3. Lag bolts: square heads type
 4. Toggle Bolts: tumble-wind type, dia. as required withstanding 300# lateral force.
- E. Concrete Fill:
1. Concrete materials and Properties: Comply with requirements of Division 3 Section - 'Concrete Work' for normal weight, ready-mix concrete with minimum 28 day compressive strength of 2500 psi, 140 lbs. cement per cu. ft. minimum and W/C ratio of 0.65 maximum, unless higher strengths indicated.

2.02 ACCESSORY COMPONENTS:

- A. Connect all handrail and guard systems with butt-welding or with welded, internal connectors.
- B. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms.
- C. Filler Plates: provide steel sheet or plate fillers required to support structural loads of handrail systems to structural supports. All plates and fillers shall be continuously welded and ground smooth to appear as a contiguous piece.
- D. Close ends of all pipes or tubes. Use rounded end caps unless noted otherwise.
- E. Provide wall returns at all ends terminating at a wall surfaces.
- F. Grout/Anchoring Cement: Non-shrink nonmetallic grout: CE CRD-C621 or erosion-resistant anchoring cement; non-staining, non-corrosive, nongaseous, recommended by manufacturer for types of applications indicated.
- G. Provide an epoxy filler around all tube sections inserted into sleeve-inserts in exterior applications

2.03 FINISHING:

- A. **Galvanizing: To ASTM A123, provide minimum 1.25 oz/sq ft galvanized coating where installed subject to weather or as noted elsewhere.**
 1. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type II Organic zinc rich.
- B. Provide bituminous coating for all metal parts in contact with concrete.
- C. Surface Preparation: Solvent-clean surfaces in compliance with SSPC-SP 1 to remove dirt, oil, grease and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel in compliance with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).
- D. Factory-Priming for Field-Painted Finish: Apply shop primer immediately following surface preparation and pretreatment.
 1. Shop primer for ferrous metal: Manufacturers of fabricator's standard, fast-curing, lead-free, Zinc-chromate primer; selected for good resistance to atmospheric corrosion, for compatibility with finish paint systems indicated and for compatibility to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements of FS TT-P-645.

2. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

PART 3 - EXECUTION:

3.01. EXAMINATION:

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

3.02. GENERAL FABRICATION:

- A. Fit and shop assemble components in largest practical sizes for delivery to site.
- B. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- C. Provide anchors, required for connecting railings to structure.
- 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. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
- G. Interior Components: Continuously seal joined pieces by continuous welds.
- H. 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.
- I. Accurately form components to suit stairs and landings, to each other and to building structure. Notify the Architect prior to erection if dimensions and clearances noted in Documents do not correspond to field conditions.
- J. Accommodate for expansion and contraction of members and building movement without damage to connections or members.

3.03. HANDRAIL FABRICATION:

- A. Fabricate steel pipe railings and handrails to design, dimensions, and details indicated. Provide railing and handrail members formed of pipe sizes and wall thickness indicated, but not less than that required to support design loading. All diameters shall comply with Barrier-Free requirements for grasp-ability.
- B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 1. At tee and cross intersections provide seamless coped joints.
 2. At bends interconnect pipe by means of flush radius bends, as applicable, or radiuses indicated.
- C. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.
- D. **Conform to Code for all extensions, terminations and/or returns of handrails.**

3.04. PREPARATION FOR INSTALLATIONS:

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- C. Supply items required to be cast into concrete with setting templates, to appropriate sections.

3.05. INSTALLATION:

- A. Install in accordance with manufacturer's instructions for all manufactured items.
- B. Install components plumb and level, accurately fitted, free from distortion or defects. Coordinate with Architect for any elements that will not fit to building components in a straight and true alignment.
- C. Anchor railings to structure with anchors and inserts.

- D. Touch-up welds with primer. Grind welds smooth.
- E. Conceal bolts and screws whenever possible
- F. Field welding: comply with AWS Code for appearance and quality of welds.
- G. Corrosion protection: coat concealed surfaces of ferrous metals that will come into contact with grout, concrete, masonry or other dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.
- H. Assemble with spigots and sleeves to accommodate tight joints and secure installation.

3.06. BASE ANCHORAGE:

- A. Adjust railings prior to anchoring to ensure matching alignment at all butting joints.
- B. For railing posts set in concrete provide sleeves of galvanized steel pipe not less than 8" long and with an inside diameter not less than 1/2" greater than the outside diameter of pipe to be inserted. Provide steel plate closure welded to bottom of sleeve and of width and length not less than 1" greater than outside diameter of sleeve to resist pull-out.
or
- C. Anchor posts in concrete by core drilling holes not less than 6 inches deep and 3/4" greater than outside diameter of post. Clean holes of loose debris, insert posts and fill space between post and concrete with the following anchoring material, mixed and placed to comply with anchoring material manufacturer's directions.
 - 1. Non-shrink, nonmetallic grout or anchoring cement.
 - 2. Cover anchorage joint with a round steel flange attached to post as follows:
 - a. Welded to post after placement of anchoring material.
 - 3. Leave anchorage joint exposed, wipe off surplus anchoring material, and leave 1/8-inch build-up, sloped away from post. For installations exposed on exterior, or to flow of water, seal anchoring material to comply with grout manufacturer's directions.

3.07. WALL ANCHORAGE

- A. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2 inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 - 2. Use type of bracket with pre-drilled hole for exposed bolt anchorage.
 - 3. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
 - 4. For hollow masonry anchorage, use toggle bolts having square heads.
 - 5. For wood stud partitions, use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.
 - 6. For steel framed gypsum board assemblies, fasten brackets directly to steel framing or concealed anchors using self-tapping screws of size and type required to support structural loads.
- B. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
- C. Anchor rail ends to steel with steel oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.

3.08. ERECTION 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

3.09. PAINTING:

- A. All steel handrailings and posts shall be shop-prepped and shop-primed.
- B. Prep over Galvanized Steel:
 - 1. All galvanized metal receiving additional coats shall be tested by use of copper sulfate test. This included using a 10% solution of copper sulfate dissolved in water and applied to the galvanized surface. The reaction time between the copper sulfate and zinc should

result in turning the galvanized area black within 15 seconds or less. If the reaction takes longer than 15 seconds, further cleaning is required.

- C. Exterior – exposed:
 - 1. Surface Prep: SSPC-SPC Commercial Blast Cleaning – remove mill scale, rust, paint and other foreign matter except for staining, by use of abrasives.
 - 2. All surfaces must be clean, dry and free of oil, grease, dust, dirt or contaminants detrimental to the coating system.
 - 3. Prime per Section 09900 – Painting with zinc-rich primer.
 - 4. Final finish per Section 09900.
- D. Coordinate with Section 09900 – Painting for additional information.
 - 1. All primer and paint to be over clean, dry, rust free material, per Section 09900 - Painting.
 - 2. After erection touch up all bolts, welds, and areas of scuffed, damaged, or missing shop primer.

END OF SECTION 05520

SECTION 06050 – CARPENTRY MATERIAL AND ACCESSORIES**PART 1 - GENERAL**1.01 **DESCRIPTION OF WORK:**

- A. Carpentry and casework materials, wood assemblies (plywood) and equipment to complete interior and exterior carpentry installations of wood, sheet goods and associated hardware.
- B. Furnishing various materials and accessories that will be used in other Specification Sections of these Documents.
- C. Configuration of assemblies of Materials herein specified

1.02 **RELATED SECTIONS:**

- A. Section 06070 – Pressure-Treated Products
- B. Section 06100 – Rough Carpentry
- C. Section 06200 - Finish Carpentry
- D. Section 06405 – Architectural Casework
- E. Section 06410 – Custom Casework
- F. Section 08800 - Glazing: Glass for casework.
- G. Section 09900 - Painting: Site finishing of cabinet exterior and interior.

1.03 **REFERENCES:**

- A. ADA - Americans with Disabilities Act (ADA) - Cabinet Hardware.
- B. ANSI A135.4 Basic Hardboard.
- C. ANSI A208.1 - Mat Formed Wood Particleboard.
- D. AWI (Architectural Woodwork Institute) - Quality Standards.
- E. BHMA A156.9 - Cabinet Hardware.
- F. FS MMM A 130 - Adhesive, Contact.
- G. HPM (Hardwood Plywood Manufacturer's Association) HP - American Standard for Hardwood and Decorative Plywood.
- H. NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates & LD-3 – 1995 for GP 28.
- I. NHLA (National Hardwood Lumber Association).
- J. PS 1 - Construction and Industrial Plywood.
- K. PS 20 - American Softwood Lumber Standard.
- L. WIC (Woodwork Institute of California) - Manual of Millwork.

1.04 **SUBMITTALS FOR REVIEW:**

- A. General: Submit per Section 01300 – Submittals.
- B. **Shop Drawings**
 - 1. Indicate **all** of the following:
 - a. materials, finishes and colors
 - b. component profiles and elevations
 - c. assembly methods, joint details, fastening methods and support considerations
 - d. accessory listings, hardware and locations
 - e. schedule of finishes/colors, whether or not shown on the Contract Drawings.
- C. Product Data: Submit manufacturer's product data for each product and process specified as work of this Section and incorporated into items of Custom Casework during fabrication, finishing and installation.
- D. Samples:
 - 1. Submit two 6 x 9 inch size samples, illustrating color, texture, finish and edge details, etc. for each material required.

1.05 **QUALITY ASSURANCE:**

- A. Provide materials and perform work in accordance with AWI quality standards for Custom Grade, unless otherwise noted.

- B. Manufacturer Qualifications: Company specializing in fabricating and installing the Products specified in this section, and any Related Section, with minimum three years documented experience.
 - C. Single-source responsibility:
 1. The contractor shall be responsible for all Products covered in this Section.
 2. Where assemblies are shown to be constructed using Products covered in Related Sections, such as light gauge metal framing, miscellaneous steel shapes, etc., the contractor shall also be responsible for the Related Section Products which are part of each assembly.
 3. All components of any assembly shall be furnished and installed by the contractor and shown on the shop drawings as such.
- 1.06 DELIVERY, STORAGE, AND PROTECTION:
- A. Protect units from moisture damage.
- 1.07 ENVIRONMENTAL REQUIREMENTS:
- A. During and after installation of work of this section, maintain the same temperature and humidity conditions in building spaces as will occur after occupancy.

PART 2 – MATERIAL/PRODUCTS:

- 2.01. GENERAL:
- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to the exclusion of equivalent products of other accepted manufacturers. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.
 - B. **Casework indicated** may be supplied as pre-manufactured units in lieu of custom-built as noted herein as long as they meet the intent of the Documents and meet or exceed the specifications herein noted.
- 2.02. HIGH PRESSURE LAMINATE MATERIALS:
- A. Provide High-Pressure laminate materials for all plastic laminate countertops, door panels, drawer panels, face-frames, **and carcasses (UON)**, as typical materials unless specifically noted otherwise on the Drawings.
 - B. **Plastic Laminate:** shall meet NEMA LD3-1995 standards;
 1. Provide 0.028+/- inch thickness (VGP) for exterior cabinet framing surfaces and vertical surfaces, meeting NEMA PF 30
 2. Provide 0.050+/- inch thickness (HGS) for General Purpose surfaces, all drawer and door panels, and all horizontal surfaces, meeting NEMA GP 50
 3. Provide 0.039+/- inch thickness (HGL) for postforming, meeting NEMA PF 42.
 - C. Color and pattern as selected by Architect; from all standard colors and patterns.
 - D. Manufacturer of Plastic Laminates:
 1. Wilsonart
 2. Nevamar.
 3. Formica.
 4. Pionite
 5. Substitutions: Refer to Section 01600.
 - E. Plastic laminate balancing sheets: shall meet NEMA LD23 – 1991 CL20 standard; .020 inch thickness for backing of all high-pressure applications where this surface is unseen.
- 2.03. LOW PRESSURE LAMINATE MATERIALS:
- A. Provide Low-Pressure Laminate materials (thermofused melamine to one or two faces of a particle board or medium-density fiberboard substrate) **only** where specifically noted in the specification or on the Drawings. **All other panel construction shall be high-pressure laminate on particle board materials.**

- B. Melamine faced (low-pressure laminate) panels:
 - 1 AWI Custom standards, composed of medium density particle board or particleboard with melamine veneers – ¼” to 1-3/8” board thicknesses
 - 2 Meet or exceed NEMA LD3-1995-VGs min. requirements and ASTM E 84-97 with Flame Spread: 90 and Smoke developed: 90.
 - 3 **Colors shall not be limited to ‘white’ or ‘beige’ and shall selected by Architect;**
 - 4 **Edge-banded** where required shall be high-pressure laminate.
- C. Approved Manufacturers shall have multiple choices for melamine colors and patterns available to the Architect, similar to:
 - 1 Panolam
 - 2 or equal

2.04. SOLID ACRYLIC POLYMER FABRICATIONS:

- A. Manufacturers shall be:
 - 1. E.I. du Pont de Nemours & Co., Inc., Corian® Surfaces.
 - 2. Formica Solid Surfacing
 - 3. Avonite
 - 4. or equal
- B. Material shall be similar in construction as:
 - 1. A solid, non-porous, homogeneous surfacing material.
 - 2. Cast, acrylic; not coated or laminated, of composite acrylic resin and natural mineral construction, meeting ANSI Z124 1980.
 - 3. Material Thicknesses – nominal English measures: 1/4 inch 1/2 inch 3/4 actual dimensions.
 - 4. Colors: As selected by Architect from manufacturer's standard selection – Grades 1 thru 2.
 - 5. The material shall meet the following characteristics:

| PROPERTY | REQUIREMENT | TEST PROCEDURE |
|-------------------------------------|---|------------------------------|
| Tensile Strength | 5000 psi min | ASTM D638 |
| Tensile Modulus | 1.0 x 10 ⁶ psi min | ASTM D638 |
| Flexural Strength | 7000 psi min | ASTM D790 |
| Flexural Modulus | 1.0 x 10 ⁶ | ASTM D790 |
| Elongation | 0.3% min. | ASTM D638 |
| Strain at Break | 0.8% min. | ASTM D638 |
| Hardness | 90-Rockwell "M" scale 52-Barcol Impressor min. | ASTM D758 |
| Thermal Expansion | 3.5 x 10 ⁻⁶ in/in/deg C max 1.95 x 10 ⁻⁶ in/in/deg F max | ASTM D696 |
| Color Stability | No change, min. 100 hours | NEMA LD3-3.10 |
| Wear and Cleanability | Passes | ANSI Z124.3 |
| Abrasion Resistance | No loss of pattern Weight loss (1000 cycles)=0.9 g. max. | NEMA LD3-3.01 ANSI Z124.3 |
| Boiling water Surface Resistance | No Change | NEMA LD3-3.05 |
| High Temperature Resistance | No Change | NEMA LD3-3.06 |
| Conductive Heat Resistance | No Change | NEMA LD3-3.08 |

| | | | |
|--|--|--|-------------|
| Impact Resistance Notched Izod Gardner | 0.24 ft.-lbs./in. of notch min. 9.0 ft-lbs min. | ASTM D256, Method A ASTM D3029 | |
| Ball drop 1/4" sheet 1/2" sheet 3/4" sheet | 36" min. with 1/2 lb ball, no failure 140" min. with 1/2 lb ball, no failure 200" min. with 1/2 lb ball, no failure | NEMA LD3-303 | |
| Stain Resistance | Passes | ANSI Z124.3 | |
| Weatherability | No change, min. 1000 hours | ASTM D1499-84 | |
| Fungi and Bacteria | No Attack | ASTM G21, ASTM G22 | |
| Specific Gravity | 1.6 min. | | |
| | | | |
| Water Absorption Weight (%max.) | 24 hrs. 0.05 (1/4") max. 0.10 (3/4") max. | Long Term 0.50 (1/4") max. 0.90 (3/4") max. | ASTM D570 |
| Flammability | | | ASTM E84 |
| | 1/4" | 1/2" | 3/4" |
| Flame spread | 25 max | 25 max | 25 max |
| Smoke Developed | 30 max | 30 max | 30 max |
| Class | 1 | 1 | 1 |

C. Accessory Products:

1. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints by chemical bond.
2. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive complying with ANSI A136.1-1967, Sealant: Manufacturer's standard mildew-resistant, FDA, UL listed silicone sealant in colors matching components.
3. UL listed.

2.05. ACCESSORIES:

- A. Adhesive: Type recommended by AWI and laminate manufacturer to suit application.
- B. Glass: Type as detailed and as specified in Section 08800.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; mill finish in concealed locations and chrome plated finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Grommets for countertops.
- G. Edge-banding for panel edging – may be on tops and/or shelving
 - 1 PVC, 'tee-mold' with width for panel thickness and profile as noted.
 - a. flat profile
 - b. color shall be by Owner
- H. Lavatory piping scald-guard. Protective pipe covers by TrueBro, or equal, to cover all exposed undersink piping, where noted or required by ADA.
- I. Vinyl Base, as selected by Architect, typical for base cabinets.

2.06. WIRE SHELVING MATERIALS:

- A. Steel Wire: Basic cold drawn, Grade C-1006; average tensile strength over 100,000 psi; coated.
- B. Wire Coating: Proprietary heavy-duty polyvinyl chloride (PVC) formula resin, plasticizers, stabilizers, pigments, and other additives.

1. Thickness: 7 to 17 mils (0.178 to 0.432 mm).
2. Classification: No ingredients listed as hazardous per OSHA 29CFR1910.0017.
- C. Laminated Panels: $\frac{3}{4}$ " Thermal-Fused Melamine laminated Particle Board.
- D. Wire Shelving Configurations:
 1. Coated steel wire, 5/8 to 1 inch incremental cross-desk spacing.
 2. Shelf & Rod – 1" spacing in White Wire (12" depths).

2.07. HARDWARE:A. **General:**

1. The hardware items noted below are available from the following manufacturers and all manufacturers listed will be considered equal:

- a. Engineered Products Company (EPCO 810-767-2050)
- b. Rockford Process Control
- c. National Lock
- d. Knape & Vogt (K&V)
- e. Blum
- f. Grass
- g. Accuride
- h. Rubbermaid

B. Drawer and Door Pulls manufactured by:

1. Engineered Products Company
2. Rockford Process Control
3. or equal
4. Style:
 - a. approx. 4" long, tubular similar to MC401-4
 - b. color/finish – brushed chromed steel

C. Catches manufactured by:

- 1 Engineered Products Company
- 2 Rockford Process Control
- 3 Knape & Vogt
- 4 Style:
 - a. 1015 by EPCO or
 - b. Alum. 916, self aligning catch by K&V.

D. Hooks manufactured by:

- 1 Engineered Products Company
- 2 or equal
- 3 Style:
 - a. CH201 – single(double), polished (brushed) chrome (brass, nickel) by EPCO

E. Drawer Slides manufactured by:

- 1 Accuride
- 2 or equal
- 3 Style:
 - a. 1029 Series, $\frac{3}{4}$ extension, 35# capacity, center mount slide or equal.

F. Hinges – European style, fully concealed manufactured by:

- 1 Grass
- 2 Blum
- 3 or equal
- 4 Style:
 - a. CLIP top BLUMOTION 110 Degree by Blum, concealed, fully adjustable.
 - b. Provide (2) two hinges for every door leaf up to 36" tall
 - c. (3) three hinges for every door leaf between 36" and 60"
 - d. (4) four hinges for every door leaf taller than 60".

G. Counter and Shelf Cutout Grommets manufactured by:

- 1 Doug Mockett and Company, Inc. Ph. (800) 523-1269.
- 2 Engineering Product Co.
- 3 or equal
- 4 Style:

- a. Provide round/oval grommets, approx 2.5" dia., at countertop equipment locations, with additional sizes and shapes to suit conditions indicated.
 - b. Color to be as selected by Architect from manufacturer's full color selections.
 - c. Supply and install (2) two grommets for every (10) lineal feet of counter surface.
 - d. Coordinate with owner/Architect for exact location in the field.
- H. Clothes Rods Manufactured by:
- 1 Engineering Products Co.
 - 2 Style:
 - a. 1-5/16" diameter polished chrome tubing (895-PC)
 - b. Corresponding polished chrome open and closed socket flanges (865-PC and 864-PC).
 - c. Supply one rod and two sockets for each 'wardrobe unit'.
- 2.08. COUNTERTOP AND SHELVING SUPPORTS:
- A. Plastic Laminate Under-Counter Brackets:
- 1 Constructed per AWI 'Premium' standards of a double layer of glued-up plastic laminate-clad 3/4" particle board with 1-1/2" wide PVC T-mold edging on the exposed bracket edge. Plastic laminate shall be high-pressure laminate. Construct each bracket with a 2-1/2" wide x 3/4" thick plastic laminate flange, clad in laminate to match bracket, for field-attachment to available support. Fasten bracket flange to supports with black, counter-sunk, fasteners at 8" O.C. vertically.
 - a. NOTE: Provide appropriate blocking so that each bracket shall be capable of supporting a 300 lb. load at any location.
 - b. Provide brackets where shown on the Drawings. If not specifically noted, provide brackets at 3'-6" O.C. spacing, maximum.
- B. Shelf Standards and Brackets manufactured by:
- 1 Knappe & Vogt
 - a. Knappe & Vogt No. 80 steel standard and No. 180 brackets, medium duty w/ 1" slot adjustments, size as required to suit application, color as selected by Architect.

PART 3 - EXECUTION

- 3.01. EXAMINATION/COORDINATION:
- A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work.
 - B. Coordinate various Specification Sections for how Materials and Accessories herein noted are to be used, combines and integrated into various woodworking responsibilities.
- 3.02. WORKMANSHIP:
- A. Shall be as required by Related Specification Sections requiring the Material and Accessories herein noted.
- 3.03. PLASTIC - LAMINATE COUNTERTOP CONSTRUCTION:
- A. Configuration: Provide Countertops with the following front, cove (intersection of top with backsplash), backsplash, and end-splash style:
 - 1. Front: Self-edge.
 - 2. Backsplash: Square edge with scribe.
 - 3. End Splash: Square edge with scribe.
 - B. Plastic-Laminate Substrate: Particleboard not less than 3/4 inch thick.
 - 1. For countertops at sinks and lavatories, use phenolic-resin particleboard or exterior grade plywood.
 - 2. Build up countertop thickness to 1-1/2 inches at front, back and ends with additional layers of particleboard laminated to top.
 - C. Backer Sheet: Provide plastic laminate backer sheet on underside of substrate.
- 3.04. WOOD TREATMENT PROCESSES:

- A. Provide Fire-retardant applications where noted and/or required by code.
 - 1. Fire Retardant (FR S Type): Chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development rating as required by applicable regulatory agencies, in accordance with ASTM E84.
 - 2. If fire-retarding inhibits the application of finishes specified – notify the Architect.

- 3.05. SHOP TREATMENT OF WOOD MATERIALS:
 - A. Shop brush-apply wood materials requiring UL fire rating to concealed wood blocking.
 - B. Provide UL approved identification on fire retardant treated material.
 - C. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
 - D. Kiln dry wood after pressure treatment to maximum 11 percent moisture content.

- 3.06. FINISHING MATERIALS:
 - A. See requirements of Related Specification for Finishing Requirements and coordinate between ‘Shop Finishing’ and ‘Field Finishing’ which is also covered in Section 09900 – Painting and Section 09920 - Finishing.

END OF SECTION 06050

SECTION 06070 - PRESSURE-TREATED WOOD PRODUCTS**PART 1 - GENERAL****1.01 SECTION INCLUDES**

- A. Preservative treatment of lumber and/or plywood by a pressure-treatment.
- B. Fire-retardant treatment of lumber and/or plywood by a pressure-treatment.
- C. Wood that shall be pressure-treated for preservation as noted in the Documents and/or required by Code and typically for:
 - 1. wood buried or in direct-ground contact
 - 2. wood in contact with concrete
 - 3. wood exposed to the weather
 - 4. wood in roof coping and flashing installations
- D. Wood that shall be pressure-treated for fire-retardants as noted in the Documents and/or required by Code and typically for:
 - 1. wood as part of a fire-rated assembly
 - 2. wood that shall be specifically treated to resistant fire as required for a Class A rating assembly
 - 3. wood that shall be resistant to fire as part of an assembly in a particular Construction Type
- E. As required in an assembly as noted in the Documents or as required by the U.L. Design component requirements.

1.02 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry
- B. Section 06200 - Finish Carpentry
- C. Division 7 – Roofing Systems

1.03 REFERENCES

- A. D3201 Standard Test Method for Hygroscopic Properties of Fire-Retardant Wood and Wood-Base Products.
- B. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron And Steel Hardware; 1998.
- C. AWPA Standard U1 for all User Specifications for treated wood.
- D. AWPA Standard T1 for all treatment standards for pressure-treated wood.
- E. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 1998
- F. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; 1996.
- G. American Wood-Protection Association (AWPA):
 - 1. E12 - Standard method of determining the corrosion of metal in contact with wood.
 - 2. M4 - Standard for the Care of Preservative Treated Wood Products.
 - 3. P5 - Standard for Waterborne Preservatives.
 - 4. P17 - Fire Retardant Formulations.
 - 5. P23 - Standard for Chromated Copper Arsenate Type C (CCA-C).
 - 6. P25 - Standard for Inorganic Boron (SBX).
 - 7. P26 - Standard for Alkaline Copper Quat Type A (ACQ-A).
 - 8. P27 - Standard for Alkaline Copper Quat Type B (ACQ-B).
 - 9. P28 Standard for Alkaline Copper Quat Type C (ACQ-C).
 - 10. P29 Standard for Alkaline Copper Quat Type D (ACQ-D).
 - 11. P47 - Standard for DCOI/Imidacloprid/Stabilizer, Waterborne (EL2).
 - 12. P50 Standard for Fire Retardant FR-2 (FR-2).
 - 13. Lumber: Comply with AWPA U1 UCFA, Type A or ICC-ES ESR 2645.
 - 14. Plywood: Comply with AWPA U1, UCFA, Type A or ICC-ES ESR 2645.
 - 15. T1 - Use Category System: Processing and Treatment Standard.
 - 16. U1 - Use Category System: User Specification for Treated Wood.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Preservative Treatment Certification: Treating plant's certification of compliance with specified standards, process employed, and preservative retention values
- C. Fire-Retardant Treatment Certification: Treating plant's certification of compliance with specified requirements

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect wood products against moisture and dimensional changes, in accordance with instructions from treating plant.

1.06 WARRANTY

- A. See Section 01740 - Closeout Submittals, for additional warranty requirements.
- B. Fire-Retardant Treated Wood: Provide manufacturer's standard 20-year limited warranty.
- C. Preservative-Treated Wood: Provide manufacturer's standard lifetime warranty.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS:

- A. **Provide preservative wood treatment that does not contain arsenic, chromium or other preservatives classified as hazardous by the Environmental Protection Agency.**
- B. Provide pressure treatment for preservative and fire-resistive protection that meets the AWPA Standard U1-13 for each Use Category System required in the Contract Documents and further:
 - 1. **The minimum AWPA Retention Requirements (pounds per cubic foot) associated with the Use Categories are as required for the particular preservative system to meet the Use Category requirements.** Minimum #/CF requirements vary from preservative material-to-material and according to application minimums.
 - 2. **If no Use Category is specifically noted in the Documents for a particular installation – the typical AWPA Service Conditions for Use Category Designations shall control.**
 - 3. The particular preservative systems as noted below in the Preservative Systems Section are acceptable as long as the preservative meets the requirements for the typical Use Categories or as noted in the Contract Documents.
 - 4. **All interior, treated wood shall have a moisture content of 19% or less (as required by Michigan Building Codes) and shall bear a mark indicating it has been air-dried (ADAT or Dry), or kiln dried after treatment (KDAT).**
 - 5. Substitutions: See Section 01600 - Product Requirements.

2.02 PRESERVATIVE TREATMENT SYSTEMS:

- A. Provide a preservative treatment system from the following types of pressure-applied additives based upon needs of the Project and as required to comply with the AWPA U1 User Categories applicable to the specific installations:
- B. Provide a waterborne, copper-based solution thus:
 - 1. Alkaline Copper Quat (ACQ-C or ACQ-D) – typically designated as ACQ
 - 2. Ammoniacal Copper Quat (ACQ-A or ACQ-B)
 - 3. Copper Azole (CA-C)
 - 4. Ammoniacal Copper Zinc Arsenate (ACZA)
 - 5. Waterborne Copper Naphthenate (CuN-W)
 - 6. Manufactured by:
 - a. Osmose, Inc
 - b. Viance
 - c. Arch Treatment Technologies
 - d. Hoover Treated Wood Products, Inc
 - e. Merichem Co.

- C. Provide a waterborne, copper based, suspension:
 - 1. Dispersed Copper Azole (μ CA-C)
 - 2. Micronized Copper Azole (MCA)
 - 3. Micronized Copper Quat (MCQ)
 - 4. Manufactured by:
 - a. Arch Treatment Technologies
 - b. Osmose, Inc
 - c. Wolman

2.03 FIRE RETARDANT SYSTEMS:

- A. Provide a fire-retardant treatment system from the following types based upon needs of the Project and as required by the AWPA U1-13 User Categories applicable to the installation:
- B. **All interior, treated wood shall have a moisture content of 19% or less (as required by Michigan Building Codes) and shall bear a mark indicating it has been air-dried (ADAT or Dry), or kiln dried after treatment (KDAT).**
- C. Treatment: No halogens, sulfates, chlorides, ammonium phosphate, oils, or solvents.
- D. Smoke Toxicity: no more than that of untreated wood.
- E. Provide a fire-retardant wood treatment for **Interior installations meeting UCFA** - thus: **not in contact with the ground and protected from exterior**
 - 1. Shall bear the Underwriters Laboratories label or stamp attesting to the FR-S rating or flame spread and smoke index rating, or the ESR 2645 Building Code Approval, and to the fact that it also meets the American Wood Protection Association (AWPA) P50, U1, UCFA for interior Type A (HT) use.
 - 2. Manufactured by:
 - a. Viance
 - b. Arch Wood Protection, Inc.
 - 1) D-Blaze FRT
 - 2) Dricon FRT
 - 3) or equal

2.04 ACCESSORIES

- A. Fasteners: For treated wood and where wood is in ground contact, subject to high relative humidity, or exposed to weather, provide galvanized fasteners with hot-dip zinc coating per ASTM A 153/A 153M.
- B. **Hot dipped galvanized fasteners and fittings are required for all accessories in contact with copper-based preservatives. .**

2.05 PRESSURE TREATMENT OF WOOD PER ASSEMBLY USE:

- A. Preservative Treatment for wood shall be:
 - 1. **Provide pressure-treated wood that meets the following AWPA U1 Use Categories for noted assemblies in the Contract Documents.**
 - a. Comply with UC1 for Interior/Dry condition.
 - b. **Comply with UC2** – Interior/Damp for wood that is used in interior locations only, protected from moisture, and not in a high-humidity installation, but may be exposed to occasional moisture
 - c. **Comply with UC3A** – Above Ground (protected) wood that is exposed to the elements, but is protected with a surface coating and/or wood that is allowed to quickly shed water and dry.
 - d. **Comply with UC3B**, Above Ground (exposed) - wood that is not in contact with the ground and will not receive a protective coating.
 - e. **Comply with UC4A**, Ground Contact (general use) - wood that is in contact with ground or fresh water.
 - f. Comply with **UCFA**, wood materials intended for fire protection and used in interior construction – not in contact with ground and protected from exterior weather. **Treat wood to UC4A**, 'in-ground use' in the following locations:
 - a. Below grade and/or in contact with water.

- b. Within 18 inches of proposed grades and where surface is not finished.
- c. In contact with masonry or concrete at exterior locations.
- 3. **Treat wood to UC3A**, 'above ground' in the following locations **specifically**: In contact with roofing, flashing, or waterproofing.
 - b. In contact with masonry or concrete in interior locations.
 - c. More than 18 inches min. from proposed grade or where a finished surface.
 - d. Exposed to weather
 - e. Other locations indicated.
- B. **Selective/Stabilizing** – Stabilize the existing wood where deteriorated at/near grade elevations:
 - 1. Apply multiple coatings/treatment applications of a penetrating, epoxy-resin wood hardener.
 - 2. Apply product per manufacturer's recommendations
 - 3. Product shall be similar to:
 - a. "Clear Penetration Epoxy Sealer" (CPES) by The Rot Doctor, Inc. drrot@rotdoctor.com
 - b. or equal

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Framing and Sheathing: Comply with installation requirements in Section 06100.
- B. Millwork and Trim: Comply with installation requirements in Section 06200.
 - 1. Interior Type A: For interior locations use fire-retardant chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation: No reductions in bending strength, stiffness, and fastener holding capacities.
 - 2. Exterior Type: Use for exterior locations and where indicated.
 - 3. All exposed pressure-treatment shall be compatible with additional finish applications that may be a part of Section 09900 – Painting. **Pressure-treatment shall be transparent and not impaired the finish quality of the product.**
- C. Fire-Retardant Treated Wood: End cuts and drilling are permitted. Do not rip or mill lumber or plywood after fire-retardant treatment.
- D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative treated lumber and plywood.

END OF SECTION 06070

SECTION 06100 - ROUGH CARPENTRY**PART 1 - GENERAL**1.01 **DESCRIPTION OF WORK:**

- A. Framing with dimensional lumber
- B. Sheathing of floors, walls and roof
- C. Roof curbs, cant and perimeter nailers
- D. Carpentry or installation for:
 - 1. blocking in walls and roof openings
 - 2. misc. lumber and blocking for attachment and support of other work
 - 3. sill gaskets and flashings
 - 4. partial exterior trimming
 - 5. construction and mounting panels
- E. Carpentry work not specified as part of other Sections and which is:
 - 1. framing for other material or systems
 - 2. generally not exposed
 - 3. not considered Finished Carpentry or Casework - which is specified elsewhere
 - 4. may be a part of misc. framing or trim

1.02 **RELATED SECTIONS**

- A. Section 03300 – Concrete Work
- B. Section 04150 - Masonry Accessories
- C. Section 06050 – Carpentry Material and Accessories
- D. Section 06070 – Pressure-treated Products
- E. Section 06200 - Finish Carpentry
- F. Section 06400 – Interior Architectural Woodwork
- G. Section 06410 – Custom Casework

1.03 **REFERENCES:**

- A. AHA (American Hardboard Association) A135.4 - Basic Hardboard
- B. ALSC (American Lumber Standards Committee) - Softwood Lumber Standards.
- C. ANSI A208.1 Mat-Formed Wood Particleboard
- D. APA (American Plywood Association);
 - 1. Structural Panels shall conform to APA Rated Sheathing and APA Rated Sturd-I-Floor per Form D510.
 - 2. Sanded panels shall conform to APA Plywood Design Specification, Form Y510.
 - 3. Veneered panels shall perform under the Voluntary Product Standard PS 1-09, Structural Plywood, Form L870 and PS 2-10, Performance Standard for Wood-Based Structural-Use Panels.
- E. AWPA (American Wood Preservers Association) C1 - All Timber Products - Preservative Treatment by Pressure Process
- F. AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process
- G. NFPA (National Forest Products Association)
- H. RIS (Redwood Inspection Service)
- I. SPIB (Southern Pine Inspection Bureau)
- J. WCLIB (West Coast Lumber Inspection Bureau)
- K. WWPA (Western Wood Products Association)

1.04 **QUALITY ASSURANCE:**

- A. Lumber Standard: Comply with PS 20.
- B. Plywood Standard: Comply with PS 1-66.
- C. Identification: Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency.

1.05 SUBMITTALS FOR REVIEW:

- A. Section 01300 - Submittals: Procedures for submittals
- B. Product Data: **Provide technical data on insulated sheathing, wood preservative materials, fire-retardant materials and application instructions.**
- C. Perform Work in accordance with the following agencies:
 - 1. Lumber Grading Agency: Certified by ALSC.
 - 2. Plywood Grading Agency: Certified by APA.
- D. In lieu of grade stamping exposed to view lumber and plywood, submit manufacturer's certificate certifying that products meet or exceed specified requirements.
- E. Samples of Exposed-To-View Wood Members: Submit two samples, 12 inches square in size illustrating wood grain, stain, and finish.

PART 2 – PRODUCTS2.01 LUMBER MATERIALS:

- A. Lumber, General:
 - 1. Nominal sizes are indicated, except as shown be detail dimensions. Provide dressed lumber, S4S, with 19% maximum moisture content and time of dressing.
 - 2. Comply with PS 20 "American Lumber Standard" and with applicable grading rules; factory-mark with grade, species, moisture content at time of surfacing, and mill; dressed lumber, S4S, unless otherwise indicated.
- B. Framing Lumber (2" through 4" thick):
 - 1. Concealed Dimension Lumber: As follows:
 - a. 2x4 less than or equal to 10 FT: Spruce-Pine-Fir/Stud
 - b. 2x4 greater than 10 FT: Spruce-Pine-Fir/No. 2
 - c. 2x6 less than or equal to 8 FT: Spruce-Pine-Fir/Stud
 - d. 2x6 greater than 8 FT: Spruce-Pine-Fir/ No. 2
 - e. 2x8 and 2x10:douglas Fir-Larch/No. 1
 - f. 2x12: Douglas Fir-Larch/No. 1
 - g. Moisture Content: S-DRY, KD 19 or MC 19 (19 percent maximum moisture content).
 - 2. For light framing (less than 6" wide), provide Construction Grade, any species, 19 percent maximum moisture content.
- C. Exposed Dimension Lumber: As follows:
 - 1. Species: Any one of the following, or as noted in the Documents:
 - a. Douglas fir-larch
 - b. Southern yellow pine
 - c. Longleaf yellow pine
 - d. Mountain hemlock
- D. Below Grade Wood Foundation Framing:
 - 1. SPF species, No. 2 and Btr. grade, 19 percent maximum moisture content.
 - 2. .60#/ cu. ft. pressure-preservative treated.
- E. Concealed blocking and framing in exterior wall and roof assemblies:
 - 1. SPF species, No. 2 and Btr. grade, 19 percent maximum moisture content.
 - 2. .40#/ cu. ft. pressure-preservative treated
 - 3. Fire-resistant treatment as required to match assembly ratings and as required

2.02 WOOD COMPONENT MEMBERS:

- A. Laminate Veneer Lumber:
 - 1. Work includes, but is not limited to: Laminated Veneer Lumber (LVL) beams, rim-joists and headers.
 - 2. Manufactured by:
 - a. Weyerhaeuser
 - b. Georgia-Pacific, LVL Series Beams and Headers.
 - c. or equal
 - 3. Certification shall be by ASTM D 5456 by APA-The Engineered Wood Association.

4. Typical Construction:
 - a. 1-3/4" and 3-1/2" thick (typical dimensions) pressure bonded, lap-jointed wood veneers, with grain of veneers running parallel in the long direction.
 - b. Design Criteria shall conform to:
 - 1) 2.0E Lam Allowable Edgewise Design Stresses - Modulus of Elasticity $E = 2.0 \times 106 \text{ psi}^2$, Flexural Stress $F_b = 2,900 \text{ psi}^3$, Horizontal Shear $F_v = 285 \text{ psi}$, Compression Perpendicular to Grain $F_c^{\perp} = 845 \text{ psi}^2$
 - 2) 1.5E Lam Allowable Edgewise Design Stresses - Modulus of Elasticity $E = 1.5 \times 106 \text{ psi}^2$, Flexural Stress $F_b = 2,250 \text{ psi}^3$, Horizontal Shear $F_v = 285 \text{ psi}$, Compression Perpendicular to Grain $F_c^{\perp} = 750 \text{ psi}^2$
 - c. Provide appropriate hangers and fasteners for beam depths and thicknesses.

2.03 SHEATHING MATERIALS:

- A. General Plywood: Comply with PS1 "U.S. Product standard for Construction and Industrial Plywood" for plywood construction panels and, for products not manufactured under PS1 provision with APA PRP-108.
 2. All plywood and sheathing material shall have an applicable APA label and all installations shall conform to the panel ratings for span lengths, exposures and thickness.
 3. See drawings for thickness and type. **If not noted otherwise conform to the following minimum dimensions and general requirements per installation panel type:**
 - a. **Exterior** panels for long-term weather exposure, plywood, 1/2" and 3/4" thick nominal, with association stamp.
 - b. **Exposure 1** panels for exposures protected from weather, similar to CDX plywood sheathing, 1/2" and 3/4" thick nominal, with association stamp.
 - c. All structural panels for single sheet installations on floor, roof or walls, or as part of an engineered diagram shall be APA rated sheathing complying to **Structural 1**, with association stamp.
 - d. APA Rated **Siding** shall be used over sheathing. Various finish surfaces are available.
 - e. **Interior** type, A-D grades for one good side exposed. A-A grades, for two good sides exposed. 3/4" thick nominal for all mounting applications, otherwise refer to Documents.
 - f. **Subflooring**: waferboard, ANSI A 208.1, Grade 2-M-W, or 3/4" nominal plywood
 - g. For backing panels for electrical equipment, provide 3/4" thick, fire-retardant treated, Interior Type A/C.
- B. Plywood/sheathing materials shall be:
 1. Plywood Roof Sheathing: APA Rated Sheathing, Structural II, Span Rating 24; Exposure Durability 1 unsanded
 2. Plywood Wall Sheathing: APA Rated Structural II, Span Rating 24; Exposure Durability 2; unsanded
 3. Plywood Floor Sheathing: APA Rated Sturd-I-Floor or APA Rated Sheathing Structural II, Span Rating 24; Exposure Durability [2]; unsanded.
 4. Plywood Underlayment: Rated Sheathing Structural II, Span Rating 24; Exposure Durability [2]; unsanded
 5. Particleboard Roof Sheathing: ANSI A208.1; APA Oriented Strand Board; wood flakes set with waterproof resin binder; unsanded faces.
 6. Particleboard Wall Sheathing: APA Oriented Strand Board; wood flakes set with waterproof resin binder; unsanded faces.
 7. Oriented Strand Board Floor Sheathing: wood flakes set with waterproof resin binder; unsanded faces.
 - a. Floor Sheathing: 5/8 inch thick, 48 x 96 inch sized sheets, tongue and groove edges.
 8. Plywood for foundations or in-contact with ground: 3/4" thick, nominal sheathing with T&G edges - with a wood preservative treatment applicable for exposure. See preservative treatments in following sections.
 9. Gypsum Wall Sheathing: Moisture resistant 1/2 inch thick, 24 x 96 inch sized sheets, square edges, water repellent paper faces.

- a. 1/2 and 5/8 inch thick, 48 x 96 inch sized sheets, square edge for plywood material
 - b. See Document sections for other types of sheathing and required thickness
 - c. Below Grade Wall Sheathing: 3/4 inch thick, 48 x 96 inch sized sheets, tongue and groove edges, pressure preservative treated
10. Cement Board:
- a. Backer Board: Cementitious, water durable, board; surfaced with fiberglass reinforcing mesh on front and back; long edges wrapped; and complying with ANSI A118.9 and ASTM C 1325.
 - i. Thickness: 1/2 in
 - ii. Width: 2 ft. 8 in., 3 ft., or 4 ft
 - iii. Length: 4 ft., 5 ft., 6 ft., or 8 ft
 - iv. Edges: Tapered
 - v. Compressive Strength: Not less than 2250 lbs. per sq. in. when tested in accordance with ASTM D 2394
 - vi. Water Absorption: Not greater than 8 percent when tested for 24 hours in accordance with ASTM C 473.
- C. Identify each plywood panel with appropriate APA trademark.
- 2.04 MISCELLANEOUS MATERIALS:
- A. Fasteners and Anchorages:
 - 1. Provide size and type recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices.
 - 2. Provide fasteners with a hot-dip zinc coating (ASTM A153) for treated lumber and where wood is in ground contact, subjected to high relative humidity, or exposed to weather.
 - 3. Toggle bolt type for anchorage to hollow masonry
 - 4. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
 - 5. Bolt or ballistic fastener for anchorages to steel
 - B. Die Stamped Connectors: 16 ga. thick, hot dipped galvanized steel.
 - C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell foam from continuous rolls.
 - D. Termite Shield: Galvanized sheet steel, 1/16 inch
 - E. Building Paper:
 - 1. Asphalt saturated felt, non-perforated, ASTM D 226.
- 2.05 PRESSURE-TREATMENT:
- A. Coordinate all pressure-treatment of dimensional wood and plywood with Section 06070 – Pressure-treated Products for additional requirements. **In general:**
 - B. Provide a preservative treatment system based upon needs of the Project and as required by the AWPA U1 User Categories applicable to the particulars of the installation:
 - 1. **Comply with UC1** for Interior/Dry condition.
 - 2. **Comply with UC2** – Interior/Damp for wood that is protected from moisture but may be exposed to occasional moisture
 - 3. **Comply with UC3A** – Above Ground (protected) wood that is exposed to the elements, but is often protected with a coating and/or wood that is allowed to quickly shed water and dry.
 - 4. **Comply with UC3B**, Above Ground (exposed) - wood that is not in contact with the ground and may not receive a protective coating.
 - 5. **Comply with UC4A**, Ground Contact (general use) - wood that is in contact with ground or fresh water.
 - C. Provide a fire-retardant treatment system from the following types based upon needs of the Project and as required by the AWPA U1-13 User Categories applicable to the installation

PART 3 - EXECUTION

3.01 INSTALLATION:

A. General:

1. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
2. Securely attach carpentry work to substrate by anchoring and fastening as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes. Use finishing nails for finish work. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.
3. Place full width continuous sill flashings under framed walls on cementitious foundations. Lap flashing joint 4 inches
4. Place sill gasket directly on sill flashing, cementitious foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

B. Wood Framing, General:

1. Provide framing members of sizes and on spacings shown on the drawings, and frame openings to comply with recommendations of "Manual for House Framing" of National Forest Products Association. Do not splice structural members between supports.
2. Anchor and nail to comply with "Recommended Nailing Schedule" of "Manual for House Framing" and other recommendations of N.F.P.A. and other recommendations of N.F.P.A.
3. Double members at openings over 24 inches wide. Space short studs over and under opening to stud spacing.
4. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists. Frame rigidly into joists.

C. Installation of Plywood:

1. Comply with recommendations of the American Plywood Association (APA).
2. Install sheathing as recommended by APA for spacing of supports or types of substrates involved in the work. Provide thickness shown or verify as required for spans and load applications.

3.02 WOOD BLOCKING, NAILERS AND GROUNDS:

- A. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached.
- B. Attach to substrates as required to support applied loading.
- C. Countersink bolts and nuts flush with surfaces, unless otherwise indicated.
- D. Build into masonry during installation of masonry and anchor to form work before concrete placement.
- E. Provide permanent grounds of dressed, preservative treated lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of finish material mounting. Shim as required to bring to perfect plumb or level.

3.03 SHEATHING:

- A. Secure roof sheathing with longer edge perpendicular to framing members and with ends staggered and sheet ends over bearing.
- B. Use sheathing clips between sheets between roof framing members. Provide solid edge blocking between sheets. Fully engage tongue and groove edges.
- C. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.
- D. Place plywood or structural-use panel sheathing at building corners for a horizontal distance of 96 inches, or provide sheet steel corner bracing.
- E. Place building paper horizontally over wall sheathing; weather lap edges and ends.
- F. Secure subfloor sheathing with longer edge perpendicular to floor framing and with end joints staggered and sheet ends over bearing. Attach with subfloor glue and drywall screws.
- G. Install plywood to two-span continuous.
- H. Place building paper between floor underlayment and subflooring.

- I. Install flooring underlayment after dust and dirt generating activities have ceased and prior to application of finished flooring. Apply perpendicular to subflooring, stagger joints of underlayment. Secure with screw fasteners.
- J. Install telephone and electrical panel back boards with plywood sheathing material where required. Size the back board by 12 inches beyond size of electrical panel.

3.04 SITE APPLIED WOOD TREATMENT:

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply two coats of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashings and other locations where moisture exposure is possible. Treat site sawn cuts.
- C. Allow preservative to dry prior to erecting members.

3.05 COORDINATION:

- A. For all materials noted herein – coordinate with the Documents for system requirements for widths, thicknesses, material characteristic and pressure-treated properties.
- B. Documents and Drawing Details shall override all specifications noted herein for specific material requirements.

END OF SECTION - 06100

SECTION 06170 – PREFABRICATED PLATE-CONNECTED WOOD TRUSSES**PART 1 - GENERAL****1.01 SUMMARY OF WORK:**

- A. Design, manufacture, and supply of wood trusses as shown on the Construction Documents and as specified.
- B. This Section includes the following:
 - 1. Gable-shaped trusses.
 - 2. Roof sheathing is specified in Division 6 Section "Rough Carpentry."

1.02 DESIGN/SUBMITTALS:

- A. Trusses shall be designed in accordance with the Standard and where any applicable design feature is not specifically covered herein, design shall be in accordance with the applicable provisions of the latest edition of the American Forest & Paper Association's (AF&PA's) National Design Specification® (NDS®) for Wood Construction and all applicable Legal Requirements.
- B. Provide shop drawings that have been signed and stamped by a qualified professional engineer.
- A. Truss Manufacturer shall furnish Truss Design Drawings prepared in accordance with all applicable Legal Requirements.
- B. Submit Product certificate, signed by officer of fabricating firm, certifying that metal-plate-connected wood trusses supplied for Project comply with specified requirements. Submit Research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction evidencing compliance of fire-retardant-treated wood with specified requirements and building code in effect for Project.
- C. If required by the Construction Documents and the Truss Manufacturer's contract, the Truss Manufacturer shall furnish a Truss Placement Diagram which shall provide at a minimum the location assumed for each Truss based on the Truss Manufacturer's interpretation of the Construction Documents.
- D. Where required by the Truss Manufacturer's contract, any local building official or applicable legal requirements, the Truss Manufacturer shall submit the Truss Submittal Package to the Building Designer and/or the local Building Official for review and approval prior to the manufacturing of the Trusses.
- E. The Truss Design Drawings shall include, at a minimum, the information specified below (per the Standard):
 - 1. Building Code used for Design, unless specified on Cover/Truss Index Sheet.
 - 2. Slope or depth, span and spacing.
 - 3. Location of all joints and support locations.
 - 4. Required bearing widths.
 - 5. Design loads as applicable, including:
 - Top Chord live load (for roof Trusses, this shall be the controlling case of live load or snow load);
 - Top chord dead load;
 - Bottom chord live load;
 - Bottom chord dead load;
 - Additional loads and locations;
 - Environmental Load Design Criteria (wind speed, snow, seismic, and all applicable factors as required to calculate the Truss loads); and
 - 6. Adjustments to Wood Member and Metal Connector Plate design values for conditions of use.
 - 7. Maximum reaction force and direction, including maximum uplift reaction forces where applicable.

8. Metal Connector Plate type, manufacturer, size, and thickness or gauge, and the dimensioned location of each Metal Connector Plate except where symmetrically located relative to the joint interface.
9. Size, species and grade for each Wood Member.
10. Truss-to-Truss connection and Truss field assembly requirements.
11. Calculated span to deflection ratio and/or maximum vertical and horizontal deflection for live and total load and KCR (creep factor) as applicable.
12. Maximum axial tension and compression forces in the Truss members.
13. Fabrication tolerance per the Standard.
14. Required Permanent Individual Truss Member Restraint location and the method of Restraint/Bracing to be used per the Standard.

1.03 DEFINITIONS:

- A. *Truss*: Individual metal-plate-connected wood component manufactured for the construction of a Building.
- B. *Truss Design Drawing*: Written, graphic and pictorial depiction of an individual Truss that includes the information required in the Standard.
- C. *Truss Design Engineer*: Person who is licensed to practice engineering as defined by the Legal Requirements of the Jurisdiction in which the Building is to be constructed and who supervises the preparation of the Truss Design Drawings.
- D. *Truss Designer*: Person responsible for the preparation of the Truss Design Drawings.
- E. *Truss Manufacturer*: Person engaged in the fabrication of Trusses.
- F. Prefabricated metal-plate-connected wood trusses include planar structural units consisting of metal-plate-connected members that are fabricated from dimension lumber and that have been cut and assembled prior to delivery to the project site.

1.04 QUALITY ASSURANCE:

- A. TPI Standards: Comply with applicable requirements and recommendations of the following Truss Plate Institute (TPI) publications:
 "Design Specification for Metal Plate Connected Wood Trusses."
 "Design Specification for Metal Plate Connected Parallel Chord Wood Trusses."
 "Commentary and Recommendations for Handling and Erecting Wood Trusses."
 "Commentary and Recommendations for Bracing Wood Trusses."
 "Quality Standard for Metal Plate Connected Wood Trusses."
- B. Connector Plate Manufacturer's Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality control procedures for manufacture of connector plates published in TPI "Quality Standard for Metal Connector Plate Manufacture."
- C. Wood Structural Design Standard: Comply with applicable requirements of N.F.P.A.
 "National Design Specification for Wood Construction."
- D. Single-Source Engineering Responsibility: Provide trusses engineered by the metal plate connector manufacturer to support superimposed dead and live loads indicated, with design approved and certified by a qualified professional engineer.
- E. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of metal-plate-connected wood trusses similar to those of this Project and with a record of successful in-service performance.
- F. Fabricator's Qualifications: A firm that complies with the following requirements for quality control and is experienced in prefabricating metal-plate-connected wood trusses similar to those of this Project that have a record of successful in-service performance:
- G. Fabricator participates in a recognized quality assurance program that involves inspection by SPIB; Timber Products Inspection, Inc.; Truss Plate Institute; or other independent inspection and testing agency acceptable to Architect and authorities having jurisdiction.
- H. Single Source Responsibility for Connector Plates: Provide metal connector plates from a single manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Handle and store trusses with care and comply with manufacturer's instructions and TPI recommendations to avoid damage from bending, overturning, or other cause which trusses are not designed to resist or endure.

1.06 SEQUENCING AND SCHEDULING:

- A. Time delivery and erection of trusses to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow erection of trusses.

PART 2 - PRODUCTS

2.01 LUMBER:

- A. Factory mark each piece of lumber with type, grade, mill, and grading agency.
- B. Lumber Standard: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
- C. Inspection Agencies: Inspection agencies and the abbreviations used to reference them to lumber grades and species include the following:
 - NLGA - National Lumber Grades Authority (Canadian).
 - SPIB - Southern Pine Inspection Bureau.
 - WCLIB - West Coast Lumber Inspection Bureau.
 - WWPA - Western Wood Products Association.
- D. Nominal sizes are indicated, except as shown by detail dimensions.
- E. Provide dressed lumber, S4S, manufactured to actual sizes required by PS 20 to comply with requirements indicated below:
- F. Moisture Content: Seasoned, with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless otherwise indicated.
- G. Grade for Chord Members: "Select Structural."
- H. Grade for Web Members: "No. 3" or "Stud" grade.
- I. Species: Any softwood species of specified grade.

2.02 METAL CONNECTOR PLATES:

- A. General: Fabricate connector plates from metal complying with requirements indicated in this article.
- B. Hot-Dip Galvanized Steel Sheet: Structural (physical) quality steel sheet complying with ASTM A 446, Grade A; zinc coated by hot-dip process to comply with ASTM A 525, Designation G60; minimum coated metal thickness indicated but not less than 0.036 inch.

2.03 CONNECTOR PLATE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering metal connector plates that may be incorporated in the Work include, but are not limited to, the following Manufacturers:
 - 1. Gang-Nail Systems, Inc.
 - 2. Inter-Lock Steel Co., Inc.
 - 3. TEE-Lok Corp.
 - 4. Truss Connectors of America.
 - 5. Truswal Systems Corporation.

2.04 FASTENERS:

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
- B. Nails, Wire, Brads, and Staples: FS FF-N-105.
- C. Power Driven Fasteners: National Evaluation Report NER-272.
- D. Wood Screws: ANSI B18.6.1.
- E. Lag Bolts: ANSI B18.2.1.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

2.05 METAL FRAMING ANCHORS:

- A. General: Provide metal framing anchors of type, size, metal, and finish indicated that comply with requirements specified including the following:
- B. Current Evaluation/Research Reports: Provide products for which reports exist from a model code organization acceptable to authorities having jurisdiction that evidence compliance of metal framing anchors for application indicated with the building code in effect for this Project.
- C. Allowable Design Loads: Provide products for which manufacturer publishes allowable design loads that are determined from empirical data or by rational engineering analysis and that are demonstrated by comprehensive testing performed by a qualified independent testing laboratory.
- D. Galvanized Steel Sheet: Steel sheet zinc-coated by hot-dip process on continuous lines prior to fabrication to comply with ASTM A 525 for Coating Designation G60 and with ASTM A 446, Grade A (structural quality); ASTM A 526 (commercial quality); or ASTM A 527 (lock-forming quality); as standard with manufacturer for type of anchor indicated.

2.06 FABRICATION:

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints with wood-to-wood bearing in assembled units.
- B. Fabricate metal connector plates to size, configuration, thickness, and anchorage details required to withstand design loadings for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances specified in TPI "Quality Standard for Metal Plate Connected Wood Trusses." Position members to produce design camber indicated.
- D. Connect truss members by means of metal connector plates accurately located and securely fastened to each side of wood members by means indicated or approved.

2.07 CUSTOM TRUSS FABRICATION:

- A. Modify the truss panel points, web member framing and connections as required to allow for clearances and passage of ductwork or other building elements that are indicated to pass through trusses.
- B. Engineers shall design and verify "boxed-out" areas for elements indicated to pass thru trusses.

PART 3 - EXECUTION3.01 INSTALLATION:

- A. General: Erect and brace trusses to comply with applicable requirements of referenced TPI standards.
- B. Where trusses do not fit, return them to fabricator and replace with trusses of correct size; do not alter trusses in the field.
- C. Cutting and altering of Trusses is not permitted. If any Truss should become broken, damaged, or altered, written concurrence and approval by a Registered Design Professional is required.
- D. Erect trusses with plane of truss webs vertical (plumb) and parallel to each other, located accurately at design spacings indicated.
- E. Hoist trusses in place by means of lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- F. Anchor trusses securely at all bearing points to comply with methods and details indicated.
- G. Install permanent bracing and related components to enable trusses to maintain design spacing, withstand live and dead loads including lateral loads, and to comply with other indicated requirements.

END OF SECTION 06170

SECTION 06200 - FINISH CARPENTRY**PART 1 - GENERAL**1.01 **DESCRIPTION OF WORK:**

- A. Finish Carpentry items, typical of a complete installation of doors and hardware, and associated with the installation of misc. accessories.
- B. Installation of doors, windows, etc.
- C. Installation of sills and trims, etc. – Hardwood, Laminate or solid polymer
- D. Installation of shop-fabricated casework
- E. Installation of countertops – Plastic laminate
- F. Installation of shelving systems
- G. Installation of misc. hardware, toilet accessories, shelving and other attachment accessories

1.02 **RELATED DOCUMENTS:**

- A. **See Section 06050 – Carpentry Materials and Accessories where material and accessories associated with this Specification Section are detailed.**
- B. Section 08710 - Door Hardware: Supply of hardware attachment devices and related accessories to this section
- C. Section 10800 - Toilet and Bath Accessories: Boxes and trim for recessed components and accessories

1.03 **RELATED SECTIONS:**

- A. Section 06050 – Carpentry Material and Accessories
- B. Section 06070 – Pressure-Treated Wood Products
- C. Section 06100 – Rough Carpentry
- D. Section 06400 – Interior Architectural Woodwork
- E. Section 06500 – Carpentry Materials and Accessories
- F. Section 08211 - Flush Wood Doors
- G. Section 08560 - Vinyl Windows
- H. Section 09900 - Painting: Painting and finishing of finish Carpentry items.
- I. Section 12355 - Pre-Manufactured Cabinetry

1.04 **REFERENCES:**

- A. ADA - Americans with Disabilities Act (ADA) - Cabinet Hardware
- B. ANSI A135.4 - Basic Hardboard
- C. ANSI A208.1 - Mat Formed Wood Particleboard
- D. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
- E. AWI - Quality Standards, Custom Grade, unless otherwise noted
- F. AWPA (American Wood Preservers Association) C2 - Lumber, Timbers, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.
- G. AWPA (American Wood Preservers Association) C20 - Structural Lumber Fire Retardant Treatment by Pressure Process
- H. BHMA A156.9 - Cabinet Hardware
- I. FS MMM A 130 - Adhesive, Contact
- J. HPMA (Hardwood Plywood Manufacturer's Association) HP American Standard for Hardwood and Decorative Plywood
- K. NEMA (National Electric Manufacturers Association) LD3 High Pressure Decorative Laminates.
- L. NHLA (National Hardwood Lumber Association)
- M. NWWDA (National Wood Window and Door Association) I.S.4 - Water Repellant Preservative Treatment for Millwork
- N. PS 1 - Construction and Industrial Plywood
- O. PS 20 - American Softwood Lumber Standard

1.05 **SUBMITTALS FOR REVIEW:**

- A. Submit under provisions of Section 01300.
- B. Shop Drawings**
 - 1. On original hard-line drawings drawn to 1/2" = 1' - 0" for composite plans/elevations; 1-1/2" = 1' - 0" for enlarged plans, elevations, and sections; and 3" = 1' - 0" for details.
 - 2. Indicate all of the following:
 - a. materials, finishes and colors
 - b. component profiles and elevations
 - c. assembly methods, joint details, fastening methods and support considerations
 - d. accessory listings, hardware and locations
 - e. schedule of finishes/colors, whether or not shown on the Contract Drawings.
 - 3. **Clearly show proposed joinery and details required for a proper installation.** For structurally critical connections, indicate design loading criteria and other pertinent information.
 - 4. Identify core material wherever used.
 - 5. Indicate Products specified in Related Sections and account for coordination of all Mechanical and Electrical devices and accessories (where applicable).
 - 6. Reference applicable Construction Document Details and/or Interior Elevations for each submitted unit.
 - 7. See Quality Assurance, below.
 - 8. **Shop Drawings copied directly from the Contract Documents shall be returned with "No Action Taken".**
- C. Product Data: Submit manufacturer's product data for each product and process specified as work of this Section and incorporated into items of finish carpentry and architectural woodwork during fabrication, finishing and installation.
- D. Provide instructions for attachment hardware and finish hardware.
- E. Samples: Submit samples as follows, coordinating shop priming with field finish to provide samples illustrating final field finish:
 - 1. Hardwood lumber with a transparent finish; 5" x 10", for each species and cut, finished on one side and one edge.
 - 2. Hardwood veneer faced panel products with transparent finish; 8-1/2" x 11", for each species and cut, with one half of exposed surface finished, with separate samples of unfaced panel product used for core.
 - 3. Hardwood panel outside corners and panel joint reveal conditions with transparent finish, in lengths no less than 2'-0".
 - 4. Trims, casings, moldings, or shaped Hardwood elements in lengths not less than 12 inches for each type.
 - 5. Laminate clad panel products; 4" x 4" for each type, color, pattern and surface finish.
 - 6. Solid acrylic polymer clad panel products; 4" x 4" for each type, color, pattern and surface finish.

1.06 QUALITY ASSURANCE:

- A. Single Source Manufacturing and Installation Responsibility: It is required that the Fabricator/Installer assume undivided responsibility for architectural woodwork including fabrication, finishing and installation.
- B. Fabricator/Installer Qualifications: Firm with minimum of five (5) years experience in successfully producing architectural woodwork similar to that indicated for this Project, with sufficient production capacity to produce required units and materials without causing delay in the Work.
- C. Quality Standards: Comply with applicable requirements of "Architectural Woodwork Quality Standards" (latest edition) for Custom Grade, by the Architectural Woodwork Institute (AWI) for each type of architectural woodwork, except as otherwise indicated.
- D. Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency identification. Omit marking from surfaces to receive transparent finish and submit mill certificate that material has been inspected and graded in accordance with requirements if it cannot be marked on a concealed surface.
- E. Coordination:

1. Architectural woodwork manufacturer shall coordinate with supplier of pre-manufactured casework (Section 12301) to procure required cabinet hardware indicated on Drawings and approved shop drawings and specified herein. Coordinate architectural woodwork shop drawings and fabrication with hardware requirements.
 - F. Single-source responsibility: The Architectural Woodwork contractor shall be responsible for all Products covered in this Section. Where Architectural Woodwork assemblies are shown as constructed using Products covered in Related Sections, such as light gauge metal framing, miscellaneous steel shapes, etc., the Architectural Woodwork contractor shall also be responsible for the Related Section Products that are part of each assembly. All components of any Architectural Woodwork assembly shall be furnished and installed by the Architectural Woodwork contractor and shown on the Architectural Woodwork shop drawings as such. Mechanical and electrical devices and accessories shall be excluded from this requirement. However, the Architectural Woodwork contractor shall be responsible for all coordination of any mechanical or electrical device to be installed in any Architectural Woodwork unit. All Mechanical and electrical devices and accessories shall be indicated on the Architectural Woodwork shop drawings.
- 1.07 REGULATORY REQUIREMENTS:
- A. Conform to applicable code for fire retardant, flame spread and smoke developed requirements.
- 1.08 PROJECT CONDITIONS:
- A. Environmental Conditions: Obtain and comply with woodwork manufacturer and installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is with +/- 1.0% of optimum moisture content from date of installation through remainder of construction period.
 - B. Field Measurements: Check actual dimensions of other construction by accurate field measurements before producing shop drawings and fabricating woodwork. Show recorded measurements on shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of work. Allow for scribing, trimming and fitting wherever taking of field measurements before fabrication might delay work.
- 1.09 FIELD MEASUREMENTS:
- A. Verify that field measurements are as indicated on reviewed shop drawings and as instructed by the manufacturer.
 - B. Provide templates for all countertops prior to fabrication.
 - C. Coordinate the work with plumbing and electrical rough in and installation of associated and adjacent components.
- 1.10 CORRELATION AND INTENT:
- A. Should a conflict occur in or between elements of the Contract Documents, the Contractor shall be deemed to have based his bid on the more expensive way of doing the work or of material supplied unless he shall have asked for and obtained a decision in writing from the Architect before submission of bids as to which method or materials will be required.

PART 2 – GENERAL LUMBER PRODUCTS:

- 2.01. GENERAL MATERIALS:
- A. **See Section 06050 – Carpentry Material and Accessories** for typical wood assemblies, sheet material and accessories required for installation in this Section.
 - B. General: Provide materials for each type of architectural woodwork that comply with requirements of the AWI "Architectural Woodwork Quality Standards" for **Standard Grade**. All materials are subject to the Architect's review. Finish work and materials shall conform in all respects to approved samples

- C. Softwood Lumber: PS 20; Graded in accordance with AWI Standard; maximum moisture content of 12 percent; with consistent color and grain of quality suitable for transparent finish.
 - 1. smooth-4-sides (S4S) unless noted otherwise
 - 2. Species: Any one of the following, or as noted in the Documents:
 - a. Douglas fir-larch
 - b. Southern yellow pine
 - c. Longleaf yellow pine
 - d. Mountain hemlock
 - e. Douglas fir
 - f. Hem-fir
 - g. Western red cedar
 - D. Concealed Solid Wood: Comply with PS 20 - American Softwood Lumber Standard; clear, dry, sound and free of defects.
 - E. Cabinet Hardware: Comply with ANSI/BHMA A156.9 "American National Standard for Cabinet Hardware." Hardware finishes complying with BHMA 1301.
- 2.02. PAINT GRADE LUMBER MATERIALS:
- A. For lumber products that are not clear-finished Hardwood, but are exposed to view (concealed non-Hardwood materials are covered in the Rough Carpentry Section):
 - 1. Painted hardwood Lumber – Poplar or Birch
 - 2. Painted Caps and Casings: Poplar or Birch, Select grade absent of visible knots or other surface irregularities
- 2.03. STANDING AND RUNNING TRIM:
- A. Quality Standard: Comply with AWI Section 300.
 - B. Backout or groove backs of flat trim members and kerf backs of other wide flat members, except for members with ends exposed in finished work.
 - C. Use solid hardwood for all profiles; do not use panel, veneered, laminated or synthetics products.
 - D. Interior Standing and Running Trim for Painted Top Coat Finish: Comply with the following requirements:
 - 1. Paint Grade: fender-jointed allowed
 - 2. Finish: See Section 09900. Paint color to be selected by Architect from manufacturer's full range. Shall match existing where so indicated on Drawings
 - 3. Profiles: To match existing and as approved. Note: trim shall match existing/adjacent at all conditions. There are two different styles of trim – 'ogee' and 'clam-shell' that shall be matched
- 2.04. SHELVING:
- A. Wood shelving material:
 - 1. ¾" or 1" plywood with applied wood trim
 - 2. Provide continuous wall cleat at back and sides of shelving.
 - 3. Provide brackets and standards to support shelving.
 - 4. Providing supports, anchors and brackets as needed to support 25#/SF loading.
 - B. Wire shelving material – see Section 06050 – Material and Accessories
- 2.05. FABRICATED ASSEMBLIES:
- A. Counter Tops:
 - 1. ¾" min. thick top with plastic laminate top and 1-1/2" edges. Edge details shall be as indicated on the Drawings.
 - B. Window Sills:
 - 1. ¾ inch thick solid polymer acrylic material, having ¼" chamfered edge details, or as shown on the Drawings
- 2.06. ACCESSORY PRODUCTS:
- A. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-

- porous joints by chemical bond.
- B. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive complying with ANSI A136.1-1967, Sealant: Manufacturer's standard mildew-resistant, FDA, UL listed silicone sealant in colors matching components.
 - C. Fasteners: Of size and type to suit application; mill finish in concealed locations and chrome plated finish in exposed locations.
 - D. Concealed Joint Fasteners: Threaded steel.
- 2.07. WOOD TREATMENT PROCESSES:
- A. All exposed wood shall be Pressure-Treated as required to maintain Flame-Spread requirements and/or Fire-Rating requirements of assemblies as indicated or required.
 - B. Coordinate with Section 06070-Pressure-Treated Lumber.
 - C. Fire retardant (FR S Type): Chemically treated and pressure impregnated; capable of providing a maximum flame spread/smoke development as required by applicable regulatory agencies, in accordance with ASTM E84.
 - D. Wood Preservative by Pressure Treatment (PT Type): AWPA Treatment C2 using water borne preservative with 0.25 percent retainage.
 - E. Wood Repellent Preservative Treatment by Dipping Method: NWWDA I.S.4, with 0.25 percent retainage
- 2.08. TREATMENT OF WOOD MATERIALS:
- A. Pressure treat wood materials requiring UL fire ratings as required or noted.
 - B. Provide UL approved identification on fire retardant treated material.
 - C. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
 - D. Kiln dry wood after pressure treatment to maximum 11 percent moisture content.

PART 3 -EXECUTION

- 3.01 INSPECTION:
- A. Examine conditions of substrates, supports and other conditions under which this work is to be performed and notify Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.
 - B. Verify adequacy of backing and support framing.
 - C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.
- 3.02 PREPARATION:
- A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.
 - B. Preinstallation Requirements: Visit project site prior to delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Proceed with woodwork installation only where involved parties agree that required ambient conditions can be maintained.
 - C. Prior to installation of architectural woodwork, examine shop-fabricated work for completion, and complete work as required, including back priming and removal of packing.
 - 1. Verify that all factory cut-outs are present. Coordinate with other trades as necessary for field cut-outs. Seal field cut edges as factory cut edges
- 3.03 GENERAL FABRICATION:
- A. Wood Moisture Content: Provide kiln-dried wood. Comply with requirements of referenced quality standard and manufacturer's recommendations for moisture content of finish carpentry.
 - B. Complete fabrication, including assembly, finishing and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as

necessary for shipment and installation. Where required for fitting at site, provide ample allowance for scribing, trimming and fitting.

- C. Factory-cut openings, mortises, etc. to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items as indicated on Drawings. Locate openings accurately and use templates or rough-in diagrams to produce accurately sized and shaped openings. Smooth edges of cut-outs and where located in countertops and similarly exposed areas, seal edges of exposed core material with a water and mildew resistant sealant or coating.

3.04 ADA REQUIREMENTS:

- A. **See “Typical Mounting Heights and Locations” Drawings in the Documents for Barrier-Free clearances and mounting information – which shall control.**
- B. The following special requirements shall be met, where indicated on Documents or as required by Statute, for Barrier-Free Accessibility:
 - 1. Countertop height: with or without cabinet below, shall not exceed a height of 34 inches AFF, at a surface depth of 24 inches.
 - 2. Kneespace Clearance: to be minimum 27 inches AFF and 30 inches clear span width.
 - 3. Sink cabinet clearances: in addition to Notes Above – upper kneespace front depth to be no less than 8 inches, lower toe front depth to be no less than 8 inches, and lower toe front depth to be no less than 11 inches at a point 9 inches AFF.
 - 4. Lavatory piping scald-guard. Protective pipe covers by TrueBro, or equal, to cover all exposed undersink piping, where noted or required by ADA.

3.05 LAMINATE FABRICATION:

- A. Fabricate to AWI Custom Grade standards.
- B. Shop assemble work for delivery to site, permitting passage through building openings.
- C. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- E. Apply plastic laminate finish in full, uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cutouts.
- F. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

3.06 INSTALLATION:

- A. Install work in accordance with AWI Quality Standard - **Standard Grade**.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install components and trim with fasteners appropriate for intended finish. All fasteners shall be concealed unless approved by Architect.
- E. Install prefinished paneling with fasteners appropriate for intended finish. All fasteners shall be concealed unless approved by Architect.
- F. Install hardware supplied by Section 08710 in accordance with manufacturer's instructions.

3.07 FINISHING OF CARPENTRY:

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and of types recommended for applied finishes.
- D. Seal, stain and varnish exposed to view surfaces. Brush apply only.
- E. Seal, stain and varnish semi-exposed to view surfaces. Brush apply only.
- F. Prime paint and seal surfaces in contact with cementitious materials.

3.08 SITE APPLIED WOOD TREATMENT:

- A. Apply preservative treatment in accordance with manufacturer's instructions.

- B. Brush apply two coats of preservative treatment on wood in contact with cementitious materials and roofing and related metal flashings. Treat all site sawn cuts with appropriate treatment.
- C. Before installation, prime paint surfaces of all painted items or assemblies to be in contact with cementitious materials
- D. Allow preservative to dry prior to erecting members.

3.09 ADJUSTMENT, CLEAN-UP AND PROTECTION:

- A. Remove all excess material, debris, cartons, containers, etc. from the premises immediately upon completion of the work.
- B. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually. Where repair is not possible, replace damaged or defective work. Adjust joinery for uniform appearance.
- C. Clean, lubricate and adjust hardware as necessary.
- D. Clean new woodwork exposed and semi-exposed surfaces as recommended by manufacturer. Touch up factory/shop applied finishes in accordance with manufacturer instructions to restore damaged or soiled areas.
- E. Protection: Implement procedures and precautions for protection of installed architectural woodwork from damage by work of other trades. Maintain conditions in a manner acceptable to manufacturer/installer and which will ensure that architectural woodwork will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 06200

SECTION 07200 - INSULATION**PART 1 - GENERAL**1.01 **SECTION INCLUDES:**

- A. Board-type insulation at perimeter foundation wall.
- B. Batt insulation (Type II – paper-faced, perm of < 1. with vapor retarder, in exterior wall and roof construction - typical.
- C. Batt insulation – Type I, to be used as sound insulation
- D. Batt insulation – Type I, without vapor retarder, where noted, or as supplement to a system of batts with vapor retarder already in place
- E. Spray-foam type insulations
- F. Fire-safing and fire-stopping
- G. Insulation in metal wall and/or roof systems
- H. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof
- I. Rigid and batt insulation
- J. Pneumatically-applied Cellulose Sound-attenuating Insulation.

1.02 **RELATED DOCUMENTS:**

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.

1.03 **RELATED SECTIONS:**

- A. Section 03300 – Concrete Work
- B. Section 04220 - Masonry wall system
- C. Section 07260 - Vapor Retarders: Vapor retarder materials to adjacent insulation.
- D. Section 07195 - Air Barriers: Air seal materials to adjacent insulation
- E. Section 09250 - Gypsum Drywall Systems
- F. Section 09510 – Suspended Acoustic Ceilings

1.04 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Division 4: Masonry

1.05 **REFERENCES:**

- A. ASTM E84 - Surface Burning Characteristics of Building Materials.
- B. ASTM C208 - Insulating Board (Cellulosic Fiber), Structural and Decorative.
- C. ASTM C516 - Vermiculite Loose Fill Insulation.
- D. ASTM C520 - Test Methods for Density of Granular Loose Fill Insulations.
- E. ASTM C578 - Preformed, Cellular Polystyrene Thermal Insulation.
- F. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation Board.
- G. ASTM C1013 - Membrane Faced Rigid Cellular Polyurethane Roof Insulation.
- H. ASTM D2842 - Water Absorption of Rigid Cellular Plastics.
- I. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
- J. NFPA 255 - Test of Surface Burning Characteristics of Building Materials.
- K. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.06 **QUALITY ASSURANCE:**

- A. Thermal Conductivity: Thicknesses shown are for thermal conductivity (k-value at 75 degrees F. (or 24 degrees C.) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by an "R" value, provide appropriate thickness.
- B. Fire Performance Characteristics: Provide insulation materials identical to those whose indicated fire performance characteristics have been determined per ASTM E 119, ASTM E 84, and ASTM E 136, as applicable, by UL or other testing and inspecting

- organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.
- C. Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with government regulations as interpreted by authorities.
 - D. Insulation shall be manufactured with a blowing agent that provides at least a 90% reduction in ozone depletion potential compared to standard CFC blowing agents.
- 1.07 SUBMITTALS:
- A. General: Submit per Section 01300 – Submittals.
 - B. Product Data: Submit manufacturer's product information, confirming compliance with specified requirements.
 - C. Submit manufacturer's CFC compliance certification.
 - D. Submit samples of specified insulation.
- 1.08 DELIVERY, STORAGE & HANDLING:
- A. All insulation to be delivered to the site dry and stored dry, flat and uncompacted.
 - B. Store and handle plastic insulation in strict compliance with manufacturer's recommendations.
 - 1. Do not expose to direct Sunlight, except as needed for period of installation and concealment.
 - 2. Protect all insulation from open flames and high heat sources.
 - 3. Avoid putting rigid insulation in contact with petroleum-based solvents or with molten asphalt or tar.
- 1.09 SEQUENCING AND SCHEDULING:
- A. Coordinate insulation installation with work of other trades.
 - B. Do not begin work of this section until work that will be concealed by insulation has been completed and accepted.
- 1.10 WARRANTY:
- A. Rigid Insulation: Shall have a limited thermal warranty stating that the R-value shall not deviate more than 10% from its published value for a period of 15 years from the manufacturing date printed on the insulation boards.

PART 2 – PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS:
Subject to compliance with requirements, provide products of one of the following as appropriate for the various applications encountered, **or as noted under the individual material information:**
- A. Dow Chemical Co.
 - B. Amoco Foam Products, Co.
 - C. Owens-Corning Fiberglas Corp.
 - D. Celotex Corporation
 - E. DuPont
 - F. CertainTeed
 - G. Johns Manville Corp.
 - H. Rockwool Industries Inc.
 - I. or Architect approved substitution under provisions of Section 01600.
- 2.02 MANUFACTURERS - GENERAL:
- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.

2.03 GENERAL REQUIREMENTS:

- A. All insulation installations shall meet Code requirements for each application at a minimum.
- B. Refer to Documents for additional information, thicknesses or assembly requirements.

2.04 RIGID INSULATION

- A. Provide preformed units in sizes to fit applications required, selected from manufacturer's standard thicknesses, widths, and lengths from materials noted below. If multiple choices are allowed the contractor has the option of material selection as long as it meets the application criteria.
- B. **For use at Foundation Wall Perimeters, and where indicated:**
 - 1. **Extruded Polystyrene Board Insulation:** Rigid, square edged, closed-cell, extruded polystyrene insulation board with integral high-density skin; complying with ASTM C578, Type IV.
 - a. Compressive Resistance: 18 lb./sq. in. minimum at yield, or 10% deformation (ASTM D1621). [Use 25 lb./sq. in for special load conditions.]
 - b. Water Absorption: 0.1% by volume, maximum (ASTM C272)
 - c. Water Vapor Permeance: 1.0 perm maximum (ASTM E96)
 - d. R-Value: **Five-year aged R-value of 5.0 deg. F • sq. ft • h/Btu per inch minimum at 75 degrees F (ASTM C518).**
 - e. Ozone Depletion Potential: Foam blowing agent shall provide at least a 90% reduction in ozone depletion potential compared to standard CFC blowing agents and shall be certified by the insulation manufacturer.
 - f. Thickness: As indicated on Drawings.
 - g. Widths to coordinate with masonry wall ties when applicable.
 - h. [Provide the required coverboard, as required by the manufacturer, dependant on the membrane roofing material used. Foamular board insulation will require a protection board under dark colored membranes.]
 - i. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to the following:
 - 1) "Styrofoam Cavitymate Plus", DOW Chemical USA
 - 2) "Foamular 250", UC Industries
 - 3) "Certifoam", Minnesota Diversified Products, Inc.
 - 4) "Tuff-RC", Celotex
 - C. **General Applications,** for use as needed or where indicated:
 - 1. Provide insulating materials to comply with requirements indicated for materials and compliance with referenced standards, in sizes to fit applications indicated, selected from Manufacturer's standard thickness, widths, and lengths.
 - 2. Extruded Polystyrene Board Insulation: ASTM C 578, type as indicated below; with 5-year aged r-values of 5.4 and 5 at 40 and 75 deg F, respectively; and as follows:
 - 1. Type IV, 1.6 pcf min. density.
 - 2. Type V, 3.0 pcf min. density.
 - 3. Type VI, 1.8 pcf min. density.
 - 4. Type VII, 2.2 pcf min. density.
 - 5. Type X, 1.35 pcf min. density.
 - 6. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 75 and 450
 - 3. **Molded Polystyrene Board Insulation:** ASTM C 578, Type as indicated below:
 - 1. Type I, 0.9 pcf min. density, aged r-values of 4.0 and 3.6 at 40 and 75 deg F, respectively.
 - 4. **Fabric-Faced Extruded Polystyrene Board Insulation at exterior foundation:** ASTM C 578, type as indicated below; with tongue and groove edges and with one side having a matrix of vertical and horizontal drainage channels faced with manufacturer's standard spun-bonded filtration fabric; with 5-year aged r-value of 4.4 at 75 deg F.
 - j. Type IV, 1.6 pcf min. density.
 - k. Type VI, 1.8 pcf min. density.

2.05 THERMAL BATT INSULATION:

- A. For use in Light Gauge Metal or Wood Framed Walls, Ceilings and where indicated:
Mineral/Glass Fiber Blanket/Batt Insulation: Inorganic glass fibers formed with binders into resilient flexible blankets or semi-rigid batts; FS HH-I-521, Type as indicated, densities of not less than 0.5 lb. per cu. ft. for glass fiber units and not less than 2.5 lb. per cu. ft. for mineral wool units k-value of 0.27; manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated; types as follows:
1. Type I: Unfaced glass fiber thermal insulation complying with ASTM C 665.
 2. Type II: Kraft-faced glass fiber insulation complying with ASTM C 665, **Class C**.
 3. Type III: Foil-faced glass fiber thermal insulation complying with ASTM C 665, **Class B and C**.
- B. R-Value 19, when tested in accordance with ASTM C 518.
1. Provide Type I unfaced units where indicated, semi-rigid in vertical spaces and where self-support is required.
 2. Provide Type II, typically
 3. Provide Type III, Class B/C, foil faced units, complying with ASTM C 665; semi-rigid in vertical spaces, where required or noted to have a perm rating of 0.5 or less, or where indicated on the Documents.
 4. Provide batts in thicknesses as required to achieve "R-value" as noted on the documents or as required by Code.
- C. Vapor Retarder Perm Rating:
1. Kraft-facing Perms Maximum 1.00
 2. When tested in accordance with ASTM E 96.
- D. Surface Burning Characteristics:
1. Unfaced Insulation: Maximum flame spread: 10; Maximum smoke developed: 10
 2. Kraft Faced Insulation: Maximum flame spread - Not Rated. Maximum smoke developed - Not Rated. When tested in accordance with ASTM E 84.
 3. Kraft facings on this insulation will burn and must not be left exposed. The facing must be installed in substantial contact with the unexposed surface of the ceiling finish material. Protect facing from any open flame or heat source.
- E. Combustion Characteristics: Unfaced insulation passes ASTM E 136.

2.06 SPRAY-ON INSULATION:

- A. Spray-on Polyisocyanurate Foam:
1. R-Value: Five-year aged R-value of 6.8 deg. F • sq. ft • h/Btu per inch minimum at 75 degrees F (ASTM C518).
 2. Full depth of framing or thickness: As indicated on Drawings.

2.07 ACOUSTIC BATT INSULATION:

- A. Type II: Kraft faced glass fiber acoustical insulation complying with ASTM C 665, Class C.
- B. Sizes:
1. Thickness 3" in typical wall cavities.
 2. In thicknesses as required for other applications to meet STC/NRC ratings required.
- C. Surface Burning Characteristics:
1. Maximum flame spread: Not Rated
 2. Maximum smoke developed: Not Rated when tested in accordance with ASTM E 84.
- D. Dimensional Stability:
1. Linear Shrinkage less than 0.1%

2.08 **THERMAL, EXTERIOR BUILDING WRAP WATERBARRIER:**

- A. Provide an exterior water-barrier wrap with a thermal value similar to R-5.0 (as required by the Building Code) to be applied to the exterior of any rigid sheathing.
- B. The material shall not trap vapor, but shall act as a 'rain screen', and shall be taped to all penetrations to prevent moisture intrusions.
- C. Shall meet Class A requirements

D. Shall be similar to Tyvek, ThermaWrap R5.0, or equal

- 2.09 BLOWN, LOOSE INSULATION MATERIALS: To be used as an insulation material and/or an acoustic barrier.
- B. Manufacturers of similar products:
1. Nu-Wool Company, Inc., 2472 Port Sheldon Street, Jenison, Michigan 49428. Toll Free (800) 748-0128. Phone (616) 669-0100. Fax (616) 669-2370. Website www.nuwool.com. E-mail info@nuwool.com.
 2. Celbar Spray-on Systems from International Cellulose Corp., applied by Retrotherm Insulators Inc. in Michigan
 3. or equal
- C. Material Description:
1. Product shall be manufactured from recycled newspapers or similar cellulose product. Post-Consumer Recycled Content: 85 percent minimum.
 2. Fibers: Treated with boric acid and sodium polyborate additives to create permanent flame resistance
 3. Fungicide Additive:
 - a. EPA registered.
 - b. Makes insulation resistant to mold growth
 4. Additives:
 - a. Non-toxic, Non-corrosive
 - b. Does not irritate normal skin
 - c. Does not give off odor during or after installation
 - d. Does not attract vermin or insects
 - e. Does not adversely affect other building materials
- D. Cellulose Insulation:
1. Typical R-value of 3.8/1" thickness
 2. Pneumatically Blown Dry into Attics and Floor Assemblies: Nu-Wool Premium Cellulose Insulation.
 3. Pneumatically Sprayed Damp into Open Wall Cavities: Nu-Wool WALLSEAL Insulation. Wall cavities shall be filled, tight as allowed by manufacturer.
 4. The net R-value shall be R-38 Min for roof applications as a value of the applied insulation in assembly.
 5. See Documents for R-Value requirements of other locations.
- E. Test Results:
1. Settled Density:
 - a. Maximum density after long-term settling of dry installation: 1.6 lbs per cu ft.
 2. Thermal Resistance:
 - a. Average thermal resistance (R-value) per inch: 3.8.
 3. Flammability Characteristics:
 - a. Critical Radiant Flux: 0.12 W/cm² minimum.
 - b. Smoldering Combustion: No evidence of flaming and weight loss of 15.0 percent maximum
 4. Moisture Vapor absorption:
 - a. Moisture Gain in Insulation: 15 percent maximum by weight.
 5. Environmental Characteristics:
 - a. When in contact with steel, copper, aluminum, or galvanized materials: Noncorrosive.
 - b. Does not support fungal growth
 6. Shall conform to ASTM E-119 – Fire Rating of 1-HR.
 7. Surface Burning Characteristics, ASTM E 84 and UL 723: Nu-Wool Premium Cellulose Insulation.
 - a. Flame Spread Index: 15.
 - b. Smoke Developed Index: 5.
 8. Similar to properties noted below, for K-13 product or equal:

| |
|---|
| K-13 Sprayed Thermal and Acoustical Insulation ASTM C-423 on Solid Backing* |
|---|

| Inches | 125 HZ | 250 HZ | 500 HZ | 1000 HZ | 2000 HZ | 4000 HZ | NRC |
|--------|--------|--------|--------|---------|---------|---------|------|
| 1.00 | 0.08 | 0.29 | 0.75 | 0.98 | 0.93 | 0.96 | 0.75 |
| 1.00** | 0.47 | 0.90 | 1.10 | 1.03 | 1.05 | 1.03 | 1.00 |
| 2.00 | 0.26 | 0.68 | 1.05 | 1.10 | 1.03 | 0.98 | 0.95 |
| 3.00 | 0.57 | 0.99 | 1.04 | 1.03 | 1.00 | 1.00 | 1.00 |

| K-13 Sprayed Thermal and Acoustical Insulation Applied at 1.5" Ribbed Metal Deck* | | | | | | | |
|---|--------|--------|--------|---------|---------|---------|------|
| Inches | 125 HZ | 250 HZ | 500 HZ | 1000 HZ | 2000 HZ | 4000 HZ | NRC |
| 1.50 | 0.36 | 0.89 | 1.26 | 1.07 | 1.01 | 1.00 | 1.05 |
| 3.00 | 0.97 | 1.04 | 1.13 | 0.99 | 0.95 | 0.98 | 1.05 |

| Property | Value | Units | Test Method |
|---------------------------------|---------------------------------------|----------------------------|-------------|
| Core Density | 1.9 – 2.2 | Lb/ft ³ | ASTM D-1622 |
| Water Vapor Transmission | <1.0 @ 2" thick | Perms | ASTM E-96 |
| R-value | 6.7 (min) @ 1" thick | Hr*ft ² * F/Btu | ASTM C-518 |
| Comprehensive Strength | 25 (min) | Psi | ASTM D-1621 |
| Flame Spread | <25 | | ASTM E -84 |
| Smoke Development | <450 | | ASTM E-84 |
| Air Leakage | 0 @ 6.24 psf | Cfm/Ft ² | ASTM E-283 |
| Tensile Bond Strength | >45 for masonry >15 for gyp. board | Psi | ASTM C-297 |
| Hydrostatic Pressure Resistance | No failure @ 184.9 cm head pressure | | AATCC 127 |

2.10 ACCESSORIES:

- A. Sheet Vapor Retarder: Specified in Section 07260
- B. Protection Boards – as required for particular application and manufacturer.
- C. Polyethylene Vapor Retarder: ASTM D 4397, 6.0 mils thick, with a maximum permeance rating of 0.13 perms.
- D. Tape: Polyethylene self-adhering type, mesh reinforced, 2 inches wide.
- E. Insulation Fasteners: Steel impale spindle and clip on flat metal base, self adhering backing, length to suit insulation thickness, capable of securely and rigidly fastening insulation in place.
- F. Staples: Steel wire; electroplated; type and size to suit application.
- G. Insulation Baffles: Non-combustible type, to permit spaces above insulated areas to vent properly.
- H. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation or mechanical anchors securely to substrates indicated without damaging or corroding insulation, anchors, or substrates.
- I. Adhesives - General: Type recommended by insulation manufacturer for application indicated.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION:

- A. Examine the areas and conditions under which work of this section will be installed. Verify that adjacent materials are dry and ready to receive insulation. Verify mechanical and electrical services within the above ceiling space have been tested and inspected.

3.02 BOARD INSTALLATION:

- A. Installation at foundation perimeter:

1. Adhere a 12-inch wide strip of polyethylene sheet over construction joints with double beads of adhesive each side of joint.
 - a. Tape seal joints.
 - b. Extend sheet full height of joint.
2. Apply adhesive in three continuous beads per board length to full bed 1/8 inch thick.
3. Install boards on foundation wall, perimeter, vertically.
 - a. Place boards in a method to maximize contact bedding.
 - b. Stagger side joints.
 - c. Butt edges and ends tight to adjacent board and to protrusions.
4. Extend boards over control and expansion joints, un-bonded to foundation 12 inches on one side of joint.
5. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

3.03 INSTALLATION OF THERMAL BATTS:

- A. Comply with manufacturer's instructions for particular conditions of installation in each case.
- B. Provide a thermal batt with a vapor retardant membrane in all applications involving an exterior envelope. The vapor membrane shall always be to the interior side of the insulation (warm side) unless specifically noted otherwise.
- C. Mechanical Fasteners – where required to support insulation:
 1. Apply insulation directly to the interior surface of the exterior wall with appropriate spindle or prong-type anchors.
 - a. Fasten anchors to wall by welding the pin to metal and then impale the insulation, or by using pre-attached heads and welding them through the insulation.
 - b. Fasten anchors to wall with adhesive. Follow manufacturer's recommendations for surface preparation and adhesive pattern.
 - c. Impale insulation on anchor and secure with washer. Select pin lengths to ensure tight fit. Protect pin tips where subject to human contact. See manufacturer's diagram for impaling pin pattern.
- D. Between Wood Studs:
 1. Friction-fit unfaced insulation between studs after cover material has been installed on one side of the cavity. When unfaced insulation is used, and in applications without a cover material, use wire or metal straps to hold insulation in place. When faced insulation is used staple attachment flanges to face or side of stud every 8 to 12 inches to prevent gaps along the edge of the vapor retarding facing
- E. Between Wood Roof Rafters:
 1. Staple insulation to the bottom face of the roof rafter at 8 to 12 inch intervals.
 - 2.
 3. Staple the first flange on inside face of roof rafter. Staple every 6-8" apart with a staple within 1" of each end of the batt. Position batt in cavity and staple the other flange to the adjoining rafter.
- F. Over Suspended Ceilings: Install insulation over ceiling panels. Butt insulation together tightly to prevent thermal leaks.
- G. Installation - Vapor Retarders:
 1. Maintain vapor retarder integrity by tightly abutting adjacent insulation. Repair punctures or tears in vapor retarder facing by taping. Follow tape manufacturer's application recommendations.

3.04 INSTALLATION OF SOUND BATTS:

- A. Place insulation above ceilings and in partitions/interstitial space as required forming a sound damping barrier. Do not compress insulation.
- B. Extend vapor retarder tight to full perimeter of adjacent door frames and other items interrupting the plane of membrane where required.
- C. Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

3.05 INSTALLATION OF SAFING INSULATION

- A. Install safing insulation to fill gap between edge of floor slab and back of exterior panels on safing clips as needed to support insulation.
- B. Cut safing insulation wider than gap to be filled to ensure compression fit and seal joint between insulation and edge of floor.
- C. Use caulking approved by safing insulation manufacturer to fill all voids.
- D. Leave no voids in completed installation.

3.06 INSTALLATION - VAPOR RETARDERS:

- A. When a separate vapor retarder is required as indicated on the Documents:
 - 1. Maintain vapor retarder integrity by tightly abutting adjacent insulation.
 - 2. Repair punctures or tears in vapor retarder facing by taping.
 - 3. Follow tape manufacturer's application recommendations.

3.07 INSPECTION:

- A. Installer must examine conditions under which insulation work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Beginning work implies that Installer accepts existing conditions.

3.08 INSTALLATION:

- A. Install insulation in strict accordance with manufacturer's instructions and recommendations and with best industry practices.
- B. Coordinate installation with work of other sections and other trades as required.
- C. Protect installed insulation and vapor retarders from harmful weather exposures and from possible physical abuses.
- D. Provide temporary coverings or enclosures where protections are needed.

END OF SECTION 07200

SECTION 07260 - VAPOR RETARDERS AND WATER BARRIERS**PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. Sheet and sealant material for controlling vapor transmission to slabs-on-grade and floor-foundation construction.
- B. Sheeting barrier and sealant materials for controlling water transmission through building envelope
- C. Membrane to control vapor from migrating to finished building materials.
- D. Membrane applications may include under-slab, below-grade, wall, roof or window vapor/water barrier situations.

1.02 RELATED SECTIONS:

- A. Section 03300 – Concrete Work: Vapor Barriers for under-slab situations.
- B. Section 07265 - Air Barriers:
- C. Section 07110 - Sheet Membrane Waterproofing
- D. Section 07160 – Bituminous Membrane Waterproofing
- E. Section 07200 - Insulation
- F. Division 7: Roofing membrane and vapor retarder.
- G. Section 07900 - Joint Sealers
- H. Section 08100 - Standard Steel Door Frames.
- I. Division 8: Window frames.

1.03 REFERENCES:

- A. ASTM A361 - Steel Sheet, Zinc Coated (Galvanized).
- B. ASTM C920 - Elastomeric Joint Sealants.
- C. ASTM D491 - Asphalt Mastic Used on Waterproofing
- D. ASTM D 4397 – Standard for Polyethylene Sheeting
- E. ASTM C804 - Recommended Practice for Use of Solvent Release Type Sealant
- F. ASTM E96 - Test Methods for Water Vapor Transmission of Materials
- G. ASTM E 1677 – Standard Specification for an Air Retarder Material
- H. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.
- I. AATCC Test Method 127 – Water Resistance: Hydrostatic Pressure Test
- J. Submit Certification by air/vapor barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- K. Certification of compatibility by air/vapor barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it.
- L. Submit test results of air permeability testing of primary air barrier material (ASTM E 2178-01)
- M. Submit test results of assembly in accordance with ABAA test protocol.

1.04 DEFINITIONS:

- A. **Vapor Retarder:** A material or assembly of materials that resists water vapor diffusion through it. The material shall have a Perm rating of < 0.75.
- B. **Water Barrier:** A material or assemble of materials that stops the flow of water through it. This material often has a perm rating above 20.0 perms to allow vapor transmission.

1.05 SYSTEM DESCRIPTION:

- A. Provide a material or assembly to perform as a continuous barrier or restrictive layer, and as a 'drainage plane' flashed to discharge to the exterior any incidental condensation or water penetration that it contacts. The membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

- B. A **vapor barrier** (material or system) shall have a maximum permeability of < 0.75 perm or less and shall be installed to limit the transmission of vapor through the construction assembly enclosing a conditioned space.
 - C. A **water barrier** (material or system) shall have a permeability of > 2.0 and shall be installed in an assembly to resist and/or control the transmission of water through the construction assembly.
 - D. Coordinate materials and installation methods to provide continuity of the retarder/barrier with requirements of other Specifications:
 - 1. In conjunction with materials described in Sections 07200 - Insulation and 07900 - Sealants.
 - 2. To seal gaps between enclosure components and opening frames.
 - E. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load. The barrier shall be joined in a continuous and flexible manner to the barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Typically - connections shall be made between the following building elements:
 - 1. Foundation and walls.
 - 2. Walls and perimeters of windows and/or doors.
 - F. Environmental Conditions: Apply air/vapor barrier within range of ambient and substrate temperatures recommended by air/vapor barrier manufacturer. Do not apply air/vapor barrier to a damp or wet substrate, unless the manufacturer specifically permits that for the product.
 - 1. Do not apply air/vapor barrier in snow, rain, fog, or mist.
 - 2. Do not apply air/vapor barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer
- 1.06 PERFORMANCE REQUIREMENTS:
- A. Maximum Vapor Permeability for vapor retarders (Perm): 1 ng/S/m/pa measured in accordance with ASTM E96 Method E.
- 1.07 SUBMITTALS FOR INFORMATION:
- A. Submit under provisions of Section 01300.
 - B. Product Data: Provide data indicating material characteristics, performance criteria, limitations, and other pertinent data as requested by Architect.
 - C. Manufacturer's Installation Instructions: Indicate preparation and installation requirements, techniques.
- 1.08 QUALITY ASSURANCE:
- A. Perform Work in accordance with SWRI - Sealant and Caulking Guide Specification requirements for materials and installation.
 - B. Maintain one copy of each document on site.
- 1.10 SEQUENCING:
- A. Sequence work under the provisions of Section 01010.
 - B. Sequence Work to permit installation of materials in conjunction with other retardant materials and seals, and air barrier assemblies.
 - C. Do not install vapor retarder until items penetrating it are in place.

PART 2 - PRODUCTS

2.01 SHEET APPLIED MATERIALS:

- A. Plastic Vapor Retarder for below-grade and other horizontal installations:
 - 1. Performance Based Specification: **Vapor Retarder membrane must meet** or exceed all requirements of ASTM E1745 Classes A, B, & C and as noted below:
 - a. Minimum Permeance: ASTM E96, 0.024 Perms

- b. Water Vapor Transmission Rate: ASTM F1249 calibrated to ASTM E96 (water method): 0.012 grains/ft²/hr
 - c. Resistance to Organisms and Substrates in Contact with Soil: ASTM E154, Section 13: 0.051 Perms
 - d. Tensile Strength: ASTM E154, Section 9: 52 LBS. Force/Inch
 - e. Puncture Resistance: ASTM D1709, Method B: 3,770 Grams
 - f. Water Vapor Retarder: ASTM E1745, meets or exceeds Class A, B & C
 - g. Thickness of Retarder (plastic) ACI 302.1R-96: Not less than 8 mils
- B. Sheet Polyethylene film: Sheet Polyethylene film reinforced with glass fiber square mesh, clear.
- 1. Thickness: 10 mil
 - 2. Permeance: As required to provide water barrier, < 1.0 perms.
 - 3. Provide primers, cleaners and other sealant materials as required by the manufacturer to make a complete system.
- C. Air/Water Resistant Sheet Barrier:
- 1. A woven or spun-bonded, non-perforated fabric sheet of olefin, polyolefin, polypropylene or similar material.
 - 2. Water Vapor Transmission: > 20 perms, when tested in accordance with ASTM E96, Method B - to allow the passage of water vapor but act as an air/water barrier in a wall assembly.
 - 3. Water Penetration Resistance: Minimum 280 cm when tested in accordance with AATCC Test Method 127.
 - 4. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
 - 5. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 10, Smoke Developed: 10.
 - 6. Supply the manufacturers recommended fasteners and sealing tape for field conditions.
 - 7. Acceptable material/manufacturers:
 - a. HardieWrap Weather Barrier as manufactured by James Hardie Building Systems.
 - b. Tyvek Commercial Wrap Water Resistant Barrier by DuPont

2.02 AUXILIARY MATERIALS:

- A. Sheet Rubberized-Asphalt Barrier flashing to counterflash metal flashings: SRAB Membrane Flashing: 32 mils of self-adhesive rubberized asphalt integrally bonded to 8 mil cross-laminated, high density polyethylene film to provide a min. 40 mil thick membrane shall be interleaved with disposable silicone-coated release paper until installed:
- 1. Blueskin® TWF by Henry Company,
 - 2. Perm-A-Barrier Wall Flashing by Grace Construction Products.
 - 3. Air-Shield™ by W.R. Meadows, Inc.
 - 4. CCW-705 TWF by Carlisle Coatings & Waterproofing
 - 5. ExoAir™ TWF by Tremco, Inc.
 - 6. HardieWrap Flex Flashing as manufactured by James Hardie Building Systems
- B. Primer: Water based liquid primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates
- 1. Aquatac as manufactured by Henry Company
 - 2. Perm-A-Barrier® WB Primer by Grace Construction Products
 - 3. Mel-Prime Water Base by W. R. Meadows or equal.
- C. Primer: Solvent based, VOC compliant primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;
- 1. Blueskin Primer by Henry Company.
 - 2. Mel-Prime VOC by W. R. Meadows
 - 3. Bituthene Primer B-2 by Grace Construction Products.
 - 4. CCW-702 Solvent-Based Primer by Carlisle Coatings & Waterproofing.
 - 5. ExoAi™r Primer or ExoAir™ GM (Glass-Mat) Primer by Tremco, Inc.
- D. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes by SRAB air/vapor barrier manufacturer.

1. CCW-704 Solvent-Based Rubberized Asphalt Mastic by Carlisle Coatings & Waterproofing
2. TREMproof® 201T Mastic by Tremco, Inc.
3. Henry 570-05 Polybitume by Henry Company
- E. Butyl-based peel and stick membrane: Transition between air/vapor barrier membrane and TPO or EPDM membranes.
 1. Grace Ultra by Grace Construction Products
- F. Sheet Membrane Air Barrier Perimeter Seal to Windows, Doors, Curtainwall and Storefront systems: Non-reinforced, cured chloroprene polymer sheet (neoprene) complying with ASTM D2000 Designation 2BC415 to 3BC620, 50 to 65 mils thick.
 1. Adhesive: Typical contact-type adhesive used for fully-adhered membranes.
 2. Lap Sealant: Typical urethane or silicone lap and termination sealant used for membrane edges recommended by manufacturer.
 3. Termination bars and fasteners Galvanized steel.
- G. Tyvek sealing tape: DuPont tape to be compatible with sheet fabric material.

2.03 SEALANTS:

- A. Provide a sealant that is appropriate for the individual membrane/substrate condition. Coordinate with the manufacturer for the appropriate sealant.
- B. If applicable - Silicone Sealant: ASTM C920, Type NS, Class 25, single component, solvent curing, non-sagging; black color; as manufactured by Dow Corning, Pecora, Tremco, GE Silicones, or Sonneborn Building Products.
 1. Elongation Capability: 25 percent.
 2. Service Temperature Range: -40 to 180 degrees F.
 3. Shore A Hardness Range 35 to 45.
- C. SPF (Sprayed Polyurethane Foam) Sealant: Provide one- or two-component, foamed-in-place, polyurethane foam sealant with the following characteristics:
 1. Density: 1.5 to 2.0 PCF.
 2. Flame Spread (ASTM E162): 25 or less.
 3. Initial R-Value (at 1 inch): Not less than 7.
 4. Acceptable materials:
 - a. Zerodraft Foam Sealant.
 - b. Zerodraft Insulating Air Sealant, Zerodraft (Division of Canam Building Envelope Specialists Inc.), Tel. 1-877-272-2626
- D. Primer: Recommended by sealant manufacturer to suit application.
- E. Cleaner: Non-corrosive type; recommended by sealant manufacturer; compatible with adjacent materials.

2.04 ADHESIVES:

- A. Mastic Adhesive: ASTM D491, asphalt type, compatible with sheet barrier and substrate, thick mastic of uniform consistency.

2.05 ACCESSORIES:

- A. Thinner and Cleaner for Butyl Sheet: As recommended by sheet material manufacturer.
- B. Seam Tape:
 1. High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 4 inches.
- C. Attachments: Galvanized steel bars and anchors.
- D. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.
- E. The equipment used to spray the polyurethane foam material shall be in accordance with ULC S705.2-02 and the equipment manufacturer's recommendations for specific type of application.
 1. Equipment settings are to be recorded on the Daily Work Record as required by the ULC S705.2-02 Installation standard.
 2. Each proportioner unit to supply only one spray gun.

PART 3 - EXECUTION**3.01 EXAMINATION:**

- A. Examine substrates, areas, and conditions under which air/vapor barrier systems will be applied, with Installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
 - 1. Do not proceed with installation until after minimum concrete curing period recommended by air/vapor barrier manufacturer.
 - 2. Ensure that:
 - a. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.
 - b. Concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
 - c. Masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
 - 3. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
 - 4. Notify Architect in writing of anticipated problems using air/vapor barrier over substrate.
- B. Verify condition of substrate and adjacent materials under provisions of Section 01039.

3.02 PREPARATION - GENERAL:

- A. Refer to Vapor Barrier manufacturer's literature for more specific requirements of preparation of substrates.
- B. Surfaces shall be free of contaminants such as grease, oil and wax on surfaces to receive membrane.
- C. The sub-surfaces should be smooth and free from projections.
- D. Strike all mortar joints full and flush to the face of the concrete block for this substrate.
- E. Fill all voids and holes greater than 1/2 of inch.
- F. Surface irregularities 1/8 inch in height or sharp to touch should be made smooth.
- G. All penetrations should be grouted or filled.
- H. If the surfaces cannot be made smooth to the satisfaction of the Architect, it will be the responsibility of the trade to alternatively apply a parge coat (typically one part cement to three parts sand) over the entire surface to receive Barrier Membrane.
- I. Remove mortar droppings on brick ties, shelf angles, brick shelves or other horizontal obstructions.
- J. Clean and prime substrate surfaces to receive adhesive and sealants in accordance with manufacturers' instructions.

3.03 INSTALLATION:

- A. For installation below Slabs-on-grade:
 - 1. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98.
 - 2. Unroll vapor barrier with the longest dimension parallel with the direction of the pour.
 - 3. Lap vapor barrier over footings and seal to foundation walls.
 - 4. Overlap joints 6 inches and seal with manufacturer's tape.
 - 5. Seal all penetrations (including pipes) with manufacturer's pipe boot.
 - 6. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
 - 7. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with tape.
 - 8. See Documents for additional information as the placement of the membrane.
- B. Install materials in accordance with manufacturer's instructions for additional vapor barrier installations – horizontal and vertical applications:

1. Vapor Retarder for Solid Substrate: Secure sheet barrier to solid construction with adhesive. Lap edges and ends 6 inches and adhesive seal to ensure complete and continuous seal.
2. Vapor Retarder for Stud Framed Walls: Secure sheet barrier to stud faces with adhesive. Lap edges over stud faces, lap ends onto adjacent construction; caulk ends with sealant to ensure complete seal.
3. Vapor Retarder for Wall/Roof Junction: Lap sheet barrier from wall retarder onto roof vapor retarder continuously. Seal edges and ends sealant to ensure complete seal. Position laps over firm bearing.
4. Vapor Retarder Seal for Openings: Install sheet barrier between window and door frames and adjacent vapor retarder and seal with sealant. Caulk with sealant to ensure complete seal. Position laps over firm bearing.
 - a. Prime all surfaces. Lap transition strip from wall substrate with 3" of full contact over firm bearing to window or doorframe with 1" of full contact. Use roller to secure membrane adhesion (SRAB transition strip) or set membrane in full bed of low modulus silicone sealant (for neoprene or extruded preformed silicone). Apply adhesive to wall, frame and membrane. Install membrane and termination bars, fastened 6" o.c. Use lap sealant over exposed edges and on cavity side (neoprene).
- C. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges or where compatibility with adjacent materials may be in doubt.

3.04 SCHEDULE:

- A. Under slab Vapor Barrier Installation: Provide a complete and continuous Vapor Barrier under the concrete floor slabs on grade for all Areas unless noted otherwise.
- B. Window Frame Perimeter: Lap sheet seal from wall air seal surface with 3 inches (75 mm) of full contact over firm bearing to window frame with 1 inch of full contact. Edge seal with approved sealant.
- C. Wall and Roof Junction: Lap sheet seal from wall seal material with 6 inches of contact over firm bearing to roof air seal membrane with 4 inches of full contact. Seal with approved sealant.

END OF SECTION 07260

SECTION 07270 - FIRESTOPPING**PART 1 - GENERAL****1.01 RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

1.02 SECTION INCLUDES:

- A. Furnishing and installing all labor, materials and equipment necessary for a complete installation of firestopping and accessories as shown on the Drawings and specified herein.
- B. All rated partitions shall have appropriate firestopping/damming installed to maintain required separations.
- C. Intumescent caulk/firestopping as required in rated assemblies.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 07200 – Insulation
- B. Section 09250 - Gypsum Drywall
- C. Division 15 - Mechanical: Mechanical work requiring firestopping
- D. Division 16 - Electrical: Electrical work requiring firestopping

1.04 REFERENCES:

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
- C. ASTM E814 - Test Method of Fire Tests of Through-Penetration Firestops.
- D. FM (Factory Mutual): Fire Hazard Classifications.
- E. UL - Underwriters Laboratories; Building Materials Fire Resistance Directory; Fire Hazard Classifications.
- F. UL 263 - Fire Tests of Building Construction and Materials.
- G. UL 723 - Test for Surface Burning Characteristics of Building Materials.
- H. UL 1479 - Fire Tests of Through-Penetration Firestops.
- I. UL 2079 – Fire Test of Construction Joints

1.05 PERFORMANCE REQUIREMENTS:

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 3. Fire-resistance-rated floor assemblies.
 - 4. Fire-resistance-rated roof assemblies.
- B. Firestop all interruptions to fire rated assemblies, materials and components.
- C. Fireproofing Materials: To achieve fire ratings as noted on Drawings, all materials shall be designated as fireproofing, firestopping or firesafing materials by Underwriter's Laboratory, and meet the requirements of ASTM E119 and ASTM E814.
- D. Surface Burning: ASTM E84, with a flame spread/fuel contributed/smoke developed ratings acceptable for intended usage and fire rating.

1.06 SUBMITTALS:

- A. Submit under provisions of Division 1.
- B. Product Data: Provide data on product characteristics, performance and limitation criteria, and other pertinent performance data.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

- D. **Manufacturer's Certificate:** Provide manufacturer's certificate certifying that products carry proper designations, and meet or exceed specified requirements.
- 1.07 **QUALIFICATIONS:**
- A. **Manufacturer:** Company specializing in manufacturing the products specified in the section with minimum ten (10) years documented experience.
 - B. **Applicator:** Company and crew specializing in successful performance of work as required by this section, with minimum five (5) years documented experience on projects of similar scope.
- 1.08 **REGULATORY REQUIREMENTS:**
- A. Conform to UL and other applicable codes for fire resistance ratings and surface burning characteristics.
 - B. Provide certificate of compliance from code authorities having jurisdiction indicating approval of combustibility.
- 1.09 **ENVIRONMENTAL REQUIREMENTS:**
- A. Only apply materials when temperature meets manufactures recommended application range for substrate material and ambient air is below 60 degrees F.
 - B. Maintain this minimum temperature before, during, and for the time required by the manufacture.
- 1.10 **SEQUENCING:**
- A. Sequence work under the provisions of Division 1.
 - B. Sequence work to permit firestopping materials to be installed after adjacent and surrounding work is complete.
- 1.11 **INCONSISTENCIES:**
- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

- 2.01 **MANUFACTURERS:**
- A. **Acceptable Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 1. Hilti (800) 879-8000
 2. Dow Corning Corp.
 3. 3M, Fire Protection Products
 4. Tremco
 5. United States Gypsum Company
 6. Or Architect approved substitution.
- 2.02 **GENERAL**
- A. **Compatibility:** Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- 2.03 **MATERIALS:**
- A. **Latex Sealants:** Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
 - B. **Firestop Devices:** Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
 - C. **Intumescent Putties:** Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

- D. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- E. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- F. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- G. Silicone Foams: Multi-component, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- H. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
- I. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.
- J. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces, when required by the manufacturer.

2.04 ACCESSORIES:

- A. Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves
- B. Installation accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place. Accessories that are part of permanent installation and visible after installation shall be paintable.
- C. For accessories or trim for fire stopped penetrations at mechanical or electrical penetrations, coordinate with Division 15 and 16 requirements.

2.05 FINISHES:

- A. Color: Any color for concealed conditions. For exposed conditions, color to be selected by Architect from manufacturer's full range, or paintable and to be finished with the interior colors.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. INSPECTION:

1. Installer must examine conditions under which the work of this section is to be performed, and shall notify Contractor immediately in writing of conditions detrimental to proper and timely installation of firestopping.
2. Installer shall not proceed with installation until unsatisfactory conditions have been corrected.
3. Beginning of installation means Installer accepts existing surfaces and conditions.

3.02 PREPARATION:

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which affect bond.
- C. Install backing materials to arrest liquid material leakage.
- D. Protect adjacent surfaces and construction.

3.03 APPLICATION:

- A. Install to manufacturer's installation procedures and the approved UL system.
- B. Apply firestopping material in sufficient thickness to achieve required rating, and to uniform density and texture.
- C. Install material at walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.
- D. Remove dam material after firestopping material has cured.
- E. Where firestopping installation is visible, paint to match surrounding wall or other construction.

3.04 CLEANING:

- A. Clean work under provisions of Division 1.
- B. Clean adjacent surfaces of firestopping materials.

3.05 PROTECTION OF FINISHED WORK:

- A. Protect finished work under provisions of Division 1.

END OF SECTION 07270

SECTION 07311 - ASPHALT SHINGLES**PART 1 - GENERAL****1.01 DESCRIPTION OF WORK:**

- A. This Section includes asphalt shingles for steep roofs.
- B. Accessories to be used in an asphalted roof installation: ridge vents, roof vents, eave vents and waterproofing edge-protection.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 6 Section "Rough Carpentry" for wood sheathing and framing.
 - 2. Division 7 Section "Flashing and Sheet Metal" for valley flashing, step flashing, drip edges, and other sheet metal work.
 - 3. Division 7 Section "Roof Accessories" for ridge vents, hatches, and roof penetrations.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 06070 – Pressure-Treated Products
- B. Section 06100 – Rough Carpentry
- C. Section 06114 – Wood Blocking and Curbing
- D. Section 07600 – Sheet Metal Flashing and Trim.
- E. Section 07720 – Roof Accessories
- F. Section 07900 – Sealants

1.03 SUBMITTALS:

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified, including details of construction relative to materials, dimensions of individual components, profiles, textures, and colors.
- C. Samples for initial selection in the form of manufacturer's sample finishes showing the full range of colors and profiles available for each type of asphalt shingle indicated.
- D. Samples for verification in the form of 2 full-size units of each type of asphalt shingle indicated showing the full range of variations expected in these characteristics.

1.04 QUALITY ASSURANCE:

- A. Fire-Test-Response Classification: Where products with a fire-test-response classification are specified, provide asphalt shingles identical to those tested according to ASTM E 108 or UL 790 and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify each bundle of asphalt shingles with appropriate markings indicating fire-test-response classification of applicable testing and inspecting agency.
- B. Wind-Resistance-Test Characteristics: Where wind-resistant asphalt shingles are indicated, provide products identical to those tested according to ASTM D 3161 or UL 997 and passed. Identify each bundle of asphalt shingles with appropriate markings of applicable testing and inspecting agency.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials to Project site in manufacturer's unopened bundles or containers with labels intact.
- B. Handle and store materials at Project site to prevent water damage, staining, or other physical damage. Store roll goods on end. Comply with manufacturer's recommendations for job-site storage, handling, and protection.

1.06 PROJECT CONDITIONS:

- A. Weather Limitations: Proceed with installing asphalt shingles only when existing and forecasted weather conditions will permit work to be performed according to manufacturers' recommendations and warranty requirements, and when substrate is completely dry.

1.07 WARRANTY:

- A. General Warranty: The special warranty specified in the Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty signed by manufacturer agreeing to repair or replace asphalt shingles that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, deformation or deterioration of asphalt shingles beyond normal weathering.
 - 1. Warranty Period: Manufacturer's standard but not less than 20 years after date of Substantial Completion.

1.08 EXTRA MATERIALS:

- A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
 - 1. Furnish 1 square (9.29 sq. m) coverage of asphalt shingles, identical to those to be installed, in unbroken bundles.

PART 2 - PRODUCTS2.01 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering asphalt shingles that may be incorporated in the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide asphalt shingles produced by one of the following:
 - 1. Atlas Roofing Corp.
 - 2. (The) Celotex Corporation.
 - 3. CertainTeed Corporation.
 - 4. Custom Roofing Company.
 - 5. Elk Corporation of America.
 - 6. GAF Building Materials Corporation.
 - 7. Georgia-Pacific Corp.
 - 8. IKO Manufacturing, Inc.
 - 9. Owens-Corning Fiberglass Corp.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work to include, but are not limited to, the following:
 - 1. Ridge Vents:
 - a. Ridge Filter Shinglevent; Air Vent, Inc.
 - b. Ridge Filtervent; Air Vent, Inc. (for Class A).
 - c. Cobra Ridge Vent; GAF Building Materials Corporation.
 - d. Roll Vent; Obdyke; Benjamin Obdyke, Inc.
 - e. Trimline; Trimline Roof Ventilation Systems.
 - 2. Waterproof Underlayment:
 - a. WinterGuard; CertainTeed Corporation.
 - b. Bituthene Ice and Water Shield; Grace: W.R. Grace & Co.
 - c. Nordshield Ice and WaterGaurd; Nord Bitumi US, Inc.
 - d. Polyguard Deck Guard; Polyguard Products, Inc.
 - e. Polyken 640 Underlayment Membrane; Polyken Technologies; Kendall Co. Division.
 - f. Moisture Guard; Tamko Asphalt Products, Inc.
 - g. Weather Watch; GAF Building Materials Corporation.

2.02 ASPHALT SHINGLES:

- A. Colors, Blends, and Patterns: Where manufacturer's standard products are indicated, provide asphalt shingles with the following requirements:

1. Provide Architect's selection from manufacturer's full range of colors, textures, and patterns for asphalt shingles of type indicated.
 2. **Provide a shingle that will match the existing installation.**
- B. Mid-weight, Laminated, Organic-Felt Shingles: Mineral-surfaced, self-sealing, laminated, multi-layer, 3-dimensional, (shadow accented), organic-felt-based asphalt shingles, complying with ASTM D 225. Provide shingles with a Class C fire-test-response classification that pass the wind-resistance-test requirements of ASTM D 3161, and have a wind resistance in excess of 60 MPH. Provide minimum 30 (40) year warranty.
- C. Hip and Ridge Shingles: Job-fabricated units cut from actual asphalt shingles used.

2.03 METAL TRIM AND FLASHING:

- A. Sheet Metal Materials: Furnish the following sheet metal materials:
1. Aluminum Sheets: ASTM B 209 (ASTM B 209M), alloy 3003 H14 with mill finish, minimum 0.024 inch thick, unless otherwise indicated.
 2. Galvanized-Steel Sheets: ASTM A 526, G 90 (ASTM A 526M, Z 275) hot-dip galvanized steel with coating designation according to ASTM A 525 (ASTM A 525M), mill phosphatized where indicated for painting; 0.0217 inch thick, unless otherwise indicated.
- B. Metal Drip Edge: Brake-formed sheet metal with at least a 2-inch roof deck flange and a 1-1/2" fascia flange with a 3/8 inch drip at lower edge. Furnish the following material in lengths 8 or 10 feet.
1. Material: Aluminum sheets.
- C. Metal Flashing: Job-cut to sizes and configurations required.
1. Material: Aluminum sheets.
 2. Material Galvanized-steel sheets.
- D. Open-Valley Metal Flashing: Preformed, inverted "V" profile at center of valley and extending at least 9 inches in each direction from centerline of valley.
1. Material: Aluminum sheets.
 2. Material: Galvanized-steel sheets.
- E. Vent Pipe Flashing: Provide thermoplastic base, no-caulk pipe boot sized to slip over pipe and designed for given roof slope as manufactured by Oatey or approved equal.

2.04 ACCESSORIES:

- A. Felt Underlayment: Type I, 36 inch wide, asphalt-saturated organic felt, complying with ASTM D 226 (No. 15) or ASTM D 4869.
- B. Waterproof Underlayment: Minimum 40-mil thick, self-adhering, polymer-modified, bituminous sheet membrane, complying with ASTM D 1970. Provide primer when recommended by underlayment manufacturer.
- C. Ridge Vent: High-density polypropylene, non-woven modified polyester, or other UV-stabilized plastic designed to be installed under asphalt shingles at ridge.
- D. Soffit Vent: Series E premium vinyl grained soffit in 12 inch panel width with grooved strength ribs and perforated pattern to allow a minimum 7 square inches of net free open area per lineal foot. Minimum vinyl wall thickness - .044 inches nominal. Similar aluminum soffit ventilation material will be accepted as alternate products upon review and concurrence by the Architect.
- E. Metal Roof Vent: Provide a low profile fully assembled metal roof vent with a minimum net free ventilation area of 150 square inches. Vents shall be fabricated from baked enamel coated aluminum for exposed to view surfaces with a galvanized steel flashing apron for roof fastening. Products must perform similar to "Ampcor" RVA-151 vents complete with insert screening.
- F. Nails: Aluminum or hot-dip galvanized steel, 0.120 inch diameter barbed shank, sharp-pointed, conventional roofing nails with a minimum 3/8 inch diameter head and of sufficient length to penetrate 3/4 inch into solid decking or at least 1/8 inch through plywood sheathing.
1. Where nails are in contact with flashing, prevent galvanic action by providing nails made from the same metal as that of the flashing.

- G. Staples: Minimum 0.0625 inch thick, zinc-coated, steel roofing staples with minimum crown width of 15/16 inch, and of sufficient length to penetrate 3/4 inch into deck lumber or through plywood deck.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine substrate for compliance with requirements for substrates, installation tolerances, and other conditions affecting performance of asphalt shingles. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION:

- A. Clean substrates of projections and substances detrimental to application. Cover knotholes or other minor voids in substrate with sheet metal flashing secured with non-corrosive roofing nails.
- B. Coordinate installation with flashings and other adjoining work to ensure proper sequencing. Do not install roofing materials until all vent stacks and other penetrations through roof sheathing have been installed and are securely fastened against movement.
- C. Remove box gutter and downspout connections as required to extend eave construction as indicated on the drawings.
- D. Remove damaged roof sheathing from the existing gabled roof construction as directed by the Architect. Have all new sheathing materials verified by the Architect or by the owner prior to covering sheathing with roofing materials.

3.03 INSTALLATION:

- A. General: Comply with manufacturer's instructions and recommendations but not less than those recommended by ARMA's "Residential Asphalt Roofing Manual" or "The NRCA Steep Roofing Manual."
 - 1. Fasten asphalt shingles to roof sheathing with either roofing staples, applied pneumatically, or nails.
- B. Felt Underlayment: Apply 1 layer of felt underlayment horizontally over entire surface to receive asphalt shingles, lapping succeeding courses a minimum of 2 inches, end laps a minimum of 4 inches, and hips and valleys a minimum of 6 inches. Fasten felt with sufficient number of roofing nails or non-corrosive staples to hold underlayment in place until asphalt shingle installation.
 - 1. Omit felt underlayment at areas of waterproof underlayment. Lap felt underlayment over waterproof underlayment as recommended by manufacturer but not less than 2 inches.
- C. Waterproof Underlayment: Apply waterproof underlayment at eaves. Cover deck from eaves to at least 24 inches inside exterior wall line.
 - 1. In addition to eaves, apply waterproof underlayment in place of felt underlayment at valleys and at hip conditions.
- D. Metal Open Valleys (if required): Comply with ARMA and NRCA recommendations. Install a second felt underlayment shingle lapped at least 12 inches and sealed with plastic asphalt cement. Install a metal valley shingle lapped at least 9 inches and sealed with plastic asphalt cement.
- E. Flashing: Install metal flashing and trim as indicated and according to details and recommendations of the "Asphalt Roofing" section of "The NRCA Steep Roofing Manual" and ARMA's "Residential Asphalt Roofing Manual."
- F. Install asphalt shingles, beginning at roof's lower edge, with a starter strip of roll roofing or inverted asphalt shingles with tabs removed. Fasten asphalt shingles in the desired weather exposure pattern; use number of fasteners per shingle as recommended by manufacturer. Use vertical and horizontal chalk lines to ensure straight coursing.
 - 1. Cut and fit asphalt shingles at valleys, ridges, and edges to provide maximum weather protection. Provided same weather exposure at ridges as specified for roof. Lap asphalt shingles at ridges to shed water away from direction of prevailing wind.

- 2. Use fasteners at ridges of sufficient length to penetrate sheathing as specified.
 - 3. Pattern: 1/3 shingle spacing offset at succeeding courses.
 - G. Ridge Vents: Install ridge vents according to manufacturer's instructions.
 - H. Roof Vents: Install roof vents and saddle construction according to manufacturer's instructions.
 - I. Gable Vents: Install sheet metal closure on the interior face of the 8 existing gable vents. Aluminum flashing material shall be baked enamel coated in a color to match the existing louver. Use self-tapping sheet metal stainless steel screws around the perimeter of the frame. Fabricate aluminum closures to the profile of the existing louver construction and apply an adhesive backed compressible gasket material along the perimeter of the frame prior to installation of the closure.
 - J. Soffit Vents: Install perforated soffit panels and trim in accordance with the product manufacturer's instructions.
 - L. Gutters and Conductors: Cut box gutter sections down as required to fit new fascia dimensions. Re-align conductor openings with wall mounted conductor locations. Fabricate 135-degree elbow sections as required to refasten conductors to gutters. All work should be straight, plumb, and true, or shall be subject to rejection by the Architect.
- 3.04 ADJUSTING:
- A. Replace any damaged materials installed under this Section with new materials that meet specified requirements.

END OF SECTION 07311

SECTION 07460 – CEMENTITIOUS SIDING**PART 1- GENERAL****1.01 DESCRIPTION OF WORK:**

- A. Installation of cementitious siding, trim and special panels – as work not specified as part of other Sections and/or as required for special details and trim. Generally a part of exterior construction.
- B. Fiber cement lap siding, panels, shingle, trim, fascia, moulding and accessories.
- C. Factory-finished fiber cement lap siding, panels, shingle, trim, fascia, moulding and accessories.
- D. **The basis of this Specification is James Hardie and style and details noted are from this manufacturer.** Other material/manufacturers are acceptable if meeting the intent and qualifications stated herein.

1.02 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.
- B. **See Section 06500 – Carpentry Materials and Accessories where material and accessories associated with this Specification Section are detailed.**

1.03 RELATED SECTIONS

- A. Section 06070 – Pressure-Treated Wood Products.
- B. Section 06100 – Rough Carpentry
- C. Section 06200 - Finish Carpentry
- D. Section 06401 – Exterior Architectural Woodwork
- E. Section 06500 – Carpentry Materials and Accessories
- F. Section 07245 – Exterior Cement Board System
- G. Section 07265 – Air Barriers
- H. Section 07900 – Joint Sealants

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum of 2 years experience with installation of similar products.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
 - 1. Submit shop drawings for all job or shop assembled architectural woodwork to the Architect for review and approval before fabrication. Show location of each item, plans and elevations with field verified dimensions, large-scale details, attachment devices and other components.

1.06 WARRANTY

- A. Product Warranty: Limited, non-pro-rated product warranty.
 - 1. HardiePlank HZ5 lap siding for 30 years.
 - 2. HardiPanel HZ5 vertical siding for 30 years.
 - 3. HardieSoffit HZ5 panels for 30 years.

4. HardieShingle HZ5 siding for 30 years.
5. Artisan HZ5 lap siding for 30 years.
- B. Product Warranty: Limited, product warranty.
- C. HardieTrim HZ and HZ5 boards for 15 years.
- D. Finish Warranty: Limited product warranty against manufacturing finish defects.
 1. When used for its intended purpose, properly installed and maintained according to James Hardie's published installation instructions, James Hardie's ColorPlus finish with ColorPlus Technology, for a period of 15 years from the date of purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.
- E. Workmanship Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: James Hardie Building Products, Inc., Toll Free Tel: 866-274-3464; Email: request info (info@jameshardie.com); Web: www.jameshardiecommercial.com
- B. Substitutions: Are permitted if products are comparable and meet stated intent and qualifications.
- C. Requests for approval of equal substitutions will be considered in accordance with provisions of Section 01600.

2.02 SIDING/TRIM MATERIALS:

- A. HardiePlank HZ5 lap siding, HardiPanel HZ5 vertical siding, HardieSoffit HZ5 panels and HardieShingle HZ5 siding requirement for Materials:
 1. Fiber-cement Siding - complies with ASTM C 1186 Type A Grade II.
 2. Fiber-cement Siding - complies with ASTM E 136 as a noncombustible material.
 3. Fiber-cement Siding - complies with ≈STM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
 4. CAL-FIRE, Fire Engineering Division Building Materials Listing - Wildland Urban Interface (WUI) Listed Product.
 5. National Evaluation Report No. NER 405 (BOCA, ICBO, SBCCI, IBC, IRC).
 6. City of Los Angeles, Research Report No. 24862.
 7. Miami Dade County, Florida Notice of Acceptance 07-0418.04.
 8. US Department of Housing and Urban Development Materials Release 1263d.
 9. California DSA PA-019.
 10. City of New York M EA 223-93-M.
 11. Florida State Product Approval FL889.
 12. Texas Department of Insurance Product Evaluation EC-23.
- B. Lap Siding: HardiePlank HZ5 Lap siding with a sloped top, beveled drip edge and nailing line as manufactured by James Hardie Building Products, Inc.
 1. Type: Smooth 5-1/4 inches with 4 inches exposure.
 2. Type: Smooth 6-1/4 inches with 5 inches exposure.
- C. Trim:
 1. HardieTrim HZ5 boards as manufactured by James Hardie Building Products, Inc.
 2. HardieTrim HZ5 Fascia boards as manufactured by James Hardie Building Products, Inc.

2.03 FASTENERS:

- A. Wood Framing Fasteners:
 1. Wood Framing: 4d common corrosion resistant nails.
 2. Wood Framing: 0.093 inch shank by 0.222 inch head by 2 inches corrosion resistant siding nails.
 3. Wood Framing: No. 11 gauge 1-1/2 inches corrosion resistant roofing nails.
 4. OR EQAUL

2.04 FINISHES

- A. Factory Finish: Refer to Exterior Finish Schedule.
 1. Product: ColorPlus Technology by James Hardie.

2. Definition: Factory applied finish; defined as a finish applied in the same facility and company that manufactures the siding substrate.
 3. Process:
 - a. Factory applied finish by fiber cement manufacturer in a controlled environment within the fiber cement manufacturer's own facility utilizing a multi-coat, heat cured finish within one manufacturing process.
 - b. Each finish color must have documented color match to delta E of 0.5 or better between product lines, manufacturing lots or production runs as measured by photospectrometer and verified by third party.
 4. Protection: Factory applied finish protection such as plastic laminate that is removed once siding is installed
 5. Accessories: Complete finishing system includes pre-packaged touch-up kit provided by fiber cement manufacturer. Provide quantities as recommended by manufacturer.
- B. Factory Finish Color for Trim, Soffit and Siding Colors. To be selected by Arch/Owner:
1. Alpine Frost JH50-10.
 2. Arctic White JH10-20.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. For Wood Frame Construction: Nominal 2 inch by 4 inch wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 1-1/2 inches face and straight, true, of uniform dimensions and properly aligned.
 1. Install water-resistive barriers and claddings to dry surfaces.
 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install a water-resistive barrier is required in accordance with local building code requirements.
- D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- E. Install Engineered for Climate™ HardieWrap™ weather barrier in accordance with local building code requirements.
- F. Use HardieWrap™ Seam Tape and joint and laps.
- G. Install HardieWrap™ flashing, and HardieWrap™ Flex Flashing

3.03 INSTALLATION - HARDIEPLANK HZ5 LAP SIDING AND ARTISAN HZ5 LAP SIDING

- A. Install materials in strict accordance with manufacturer's installation instructions.
- B. Starting: Install a minimum 1/4 inch thick lath starter strip at the bottom course of the wall. Apply planks horizontally with minimum 1-1/4 inches wide laps at the top. The bottom edge of the first plank overlaps the starter strip.
- C. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- D. Align vertical joints of the planks over framing members.
- E. Maintain clearance between siding and adjacent finished grade.
- F. Locate splices at least one stud cavity away from window and door openings.
- G. Wind Resistance: Where a specified level of wind resistance is required Hardieplank lap siding is installed to framing members and secured with fasteners described in Table No. 2 in National Evaluation Service Report No. NER-405.

- H. Locate splices at least 12 inches away from window and door openings.
- 3.04 INSTALLATION - HARDIETRIM HZ5 BOARDS – as required:
- A. Install materials in strict accordance with manufacturer's installation instructions. Install flashing around all wall openings.
 - B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
 - C. Place fasteners no closer than 3/4 inch and no further than 2 inches from side edge of trim board and no closer than 1 inch from end. Fasten maximum 16 inches on center.
 - D. Maintain clearance between trim and adjacent finished grade.
 - E. Trim inside corner with a single board trim both side of corner.
 - F. Outside Corner Board Attach Trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2 inch from edge spaced 16 inches apart, weather cut each end spaced minimum 12 inches apart.
 - G. Allow 1/8 inch gap between trim and siding.
 - H. Seal gap with high quality, paint-able caulk.
 - I. Shim frieze board as required to align with corner trim..
 - J. Fasten through overlapping boards. Do not nail between lap joints.
 - K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten HardieTrim boards to HardieTrim boards.
 - L. Shim frieze board as required to align with corner trim.
 - M. Install HardieTrim Fascia boards to rafter tails or to sub fascia.
- 3.05 FINISHING of UNFINISHED HARDI-SIDING:
- A. All gaps/joints shall be sealed to adjacent material prior to any priming or final finishing. Provide a backer-rod where required and use appropriate sealant to resist expansion/contraction properties.
 - B. All cut edges or unprimed boards shall receive a heavy coat of an approved primer – at minimum.
 - C. Finish unprimed siding with a minimum one coat high quality, alkali resistant primer and one coat of either, 100 percent acrylic or latex or oil based, exterior grade topcoats or two coats high quality alkali resistant 100 percent acrylic or latex, exterior grade topcoat within 90 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.
 - D. Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic or latex or oil based exterior grade paint within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.
- 3.06 PROTECTION
- A. Protect installed products until completion of project.
 - B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 07460

SECTION 07600 – FLEXIBLE SHEET FLASHING AND TRIM**PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. General - The following types of work are specified in this section:
 - 1. Miscellaneous flashings, building trim and accessories to complete a wall or roof assembly or to make an assembly water-tight. Similar to:
 - a. Flexible flashings to form a continuous water-proofing barrier in a wall or roofing assembly
 - b. Metal counter-flashings over metal or composite base flashings
 - c. Metal or composite base flashings
 - 2. Copings, gravel stops, caps, sills, and other flexible metal fabrications, that can be formed in the field, consistent with wall and/or roof assemblies that are not pre-manufactured.

1.02 RELATED SECTIONS:

- A. Section 03300 – Concrete Work
- B. Section 04150 – Masonry Accessories – See this Section for Thru-wall flashings in masonry conditions.
- C. Section 05040 – Galvanizing
- D. Section 06070 – Pressure-Treated Products
- E. Section 06100 - Rough Carpentry
- F. Section 06114 – Wood Blocking and Curbing
- G. Section 07720 - Roof Accessories
- H. Section 07900 - Joint Sealers
- I. Section 09900 - Painting

1.03 REFERENCES:

- A. AISI (American Iron and Steel Institute) - Stainless Steel Uses in Architecture
- B. ASTM A167 - Stainless and Heat-Resisting Chromium Nickel Steel Plate
- C. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot Dip Process.
- D. ASTM B32 - Solder Metal
- E. ASTM B209 - Aluminum and Alloy Sheet and Plate
- F. ASTM B370 - Copper Sheet and Strip for Building Construction
- G. ASTM B486 - Paste Solder
- H. ASTM D226 - Asphalt Saturated Organic Felt Used in Roofing and Waterproofing
- I. ASTM D4586 - Asphalt Roof Cement, Asbestos-Free
- J. CDA (Copper Development Association) - Contemporary Copper, A Handbook of Sheet Copper Fundamentals, Design, Details and Specifications
- K. CDA - Copper Roofing: A Practical Handbook
- L. FS O F 506 - Flux, Soldering, Paste and Liquid
- M. NRCA (National Roofing Contractors Association) - Roofing Manual
- N. SMACNA - Architectural Sheet Metal Manual

1.04 PERFORMANCE REQUIREMENTS:

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install flashings at roof edges to comply with recommendations of FM Loss Prevention Data Sheet 1-49 for the following wind zone:
 - 1. **Wind Zone 2: Wind pressures of 31 to 45 psf.**
- C. **Thermal Movements:** Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of

components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (range): 120 deg. F., ambient; 180 deg. F. material surfaces.
- D. Provide sheet metal flashing and trim that does not allow water infiltration to building interior.

1.05 SUBMITTALS:

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate material profile, **jointing pattern**, jointing details, fastening methods, flashings, thicknesses (weights), terminations, and installation details.
1. All sheet metal runs shall be constructed of the longest length material available and/or to patterns indicated on the Documents.
 2. Note any none conformance of the material installations with the Documents in the Shop Drawings.
- C. Samples: Submit samples illustrating typical material and finish.
- D. Provide information on: thicknesses, weight, gauge and finish characteristics.

1.06 WARRANTY (SHEET METAL):

- A. The roofing contractor, the sheet metal contractor, and the general contractor shall jointly warrant that all sheet metal work executed for this project shall be free from defects of materials and workmanship for a period of two (2) years from date of substantial completion of this project, as defined in the general conditions.
- B. During this warranty period the roofing contractor, the sheet metal contractor and the general contractor shall make good, at their expense, as a part of this contract and without additional charge, any and all damage to other work occasioned by defective materials and workmanship defined as flashing and sheet metal work, as well as his own defective work.
- C. Issuance of final certificate of payment is contingent upon Architect's receipt of warranty in writing.

1.07 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Stack preformed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.

PART 2 - PRODUCTS

2.01 METAL TRIM MATERIALS:

- A. Aluminum Sheet:
1. Prefinished (Brake Metal) Aluminum: ASTM B209; 0.032 inch thick (20 ga.) ; plain finish shop pre-coated with Kynar 500 coating of color as selected by Architect, to match wall or roof panel system.
 2. Provide 0.040" min. thickness (approx. 18 ga.) for panels more than 12" in any dimension and/or where noted on the Documents.

2.02 FLEXIBLE SHEET MATERIALS:

- A. Aluminum Sheet:
1. ASTM B 209, alloy 3003-H16; 0.032" min. thickness approx. 20 ga. mill finish when not a part of the wall or roof system. To match wall system or window system if not noted otherwise.
 2. Extruded Aluminum: ASTM B221, alloy 6063-T52, thickness of 0.080" min. (12 ga.)
 3. Prefinished Aluminum: ASTM B209; 0.032 inch thick; plain finish shop pre-coated with Kynar 500 coating of color as selected by Architect, to match wall or roof panel system.

4. Provide 0.040" min. thickness (approx. 18 ga.) for panels more than 12" in any dimension and/or where noted on the Documents.
- B. Fully adhered metal composite flexible flashing type:
 1. Product standard of quality: York Manufacturing, Inc.; York Seal.
 2. Characteristics:
 - a. Type: 40 mil minimum thickness by manufacturer standard roll lengths and made of high density four plies cross laminated polyethylene film and asphalt.
 - b. Termination mastic and surface conditioner/primer: Flashing manufacturer's standard products recommended for use with flashing material.
 - c. Termination bar option: Manufacturer's standard continuous length complete with fasteners.
 - d. Exposed edge metal: 28 gauge stainless steel, #4 finish
 - e. Provide flashing manufacturer's preformed end dams; material compatible with flashing material
- C. Sheet plastic type:
 1. Product standard of quality: York Manufacturing, Inc.; Wascoseal.
 2. Characteristics:
 - a. Type: 30 20 mil minimum thickness by manufacturer standard roll lengths, non-reinforced, homogeneous vinyl sheet; widths required.
 - b. Adhesive: Flashing manufacturer's adhesive recommended for use with flashing material.
 - c. Exposed edge metal: 28 gauge stainless steel, #4 finish.
 - d. Termination bar: Manufacturer's standard continuous length complete with fasteners.
 - e. Provide flashing manufacturer's preformed end dams; material compatible with flashing material.
- D. Extruded Aluminum: ASTM B 221, alloy 6063-T52, with a minimum thickness of 0.080" for primary legs of extrusions unless otherwise indicated
 1. Prefinished Aluminum: ASTM B209; 0.032 inch thick; plain finish shop pre-coated with Kynar 500 coating of color as selected by Architect, to match wall or roof panel system.
- E. Pre-coated Galvanized Steel: ASTM A446, Grade A, G120 zinc coating; core steel, shop pre-coated with modified silicone coating of medium bronze (when used per aluminum storefront system).

2.03 UNDERLAYMENT MATERIALS:

- A. Polyethylene Sheet: 6-mil (min.) thick polyethylene sheet complying with ASTM D 4397.
- B. Felts: ASTM D 226, Type II, asphalt-saturated organic felt, non-perforated.
- C. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.

2.04 MISCELLANEOUS MATERIALS:

- A. General material:
 1. Provide type solder and fasteners recommended by producer of metal sheets, for fabrication and installation.
- B. Splice plates:
 1. Provide splice plates of similar material behind coping/fascia with a bead of sealant each side of open joint.
 2. Do not set joint with sealant.
 3. Maintain open joint 1/8" – 1/4" to allow for expansion of stock.
- C. Roofing Cement:
 1. FS SS-C-153, Type I, asphaltic base.
- D. Fasteners: Nails and Screws
 1. Annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 2. Exposed Fasteners: Same material as flashing sheet, or other as recommended by manufacturer of flashing sheet.
 3. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer heads.

- E. Solder for Stainless Steel: ASTM B 32, grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- F. Sealing Tape: provide pressure-sensitive, 100 percent solids, and polyisobutylene compound sealing tape. P Provide permanently elastic, non-sag and non-toxic tape.
- G. Butyl Sealant: per ASTM C 1311, single-component, solvent-release butyl rubber sealant for hooked-type expansion joints with limited movement.
- H. Cleats: Same metal and gauge as sheet being anchored, 2" wide (min.), punched for 2 anchors.
- I. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

2.05 ACCESSORIES:

- A. Underlayment: ASTM D226, No. 15 asphalt saturated roofing felt.
- B. Primer: Zinc chromate type.
- C. Protective Backing Paint: Zinc chromate alkyd or Bituminous.
- D. Sealant: Acrylic type, specified in Section 07900.
- E. Bedding Compound: Rubber asphalt type.
- F. Plastic Cement: ASTM D4586, Type I.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.
- H. Reglets: Surface mounted Recessed type, galvanized steel.
- I. Downspout Supports: Brackets.
- J. Gutter supports when noted or as custom architectural shaped gutters: pre-formed/bent metal support brackets
- K. Solder: ASTM B32; 50/50 type.
- L. Flux: FS O F 506.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION:

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
- C. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- D. Select thicknesses of sheet metal flashing and trim to install without oil canning, buckling and tool marks, with exposed edges folded back to form hems. Form sections true to shape, accurate in size, square, and free from distortion or defects. Form pieces in longest possible lengths.

3.03 FABRICATION:

- A. Fabricate non-moving seams with flat-lock seams. Back seams with epoxy seam sealer.
- B. All fasteners shall be concealed unless specifically noted in shop drawings and approved by the Architect.
- C. Fabricate cleats of same material as sheet, interlockable with sheet.
- D. Hem exposed edges on underside 1/2 inch typical; miter and seam corners. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip – unless indicated otherwise.
- E. Form fascia material as flush seams with splice plate backing flat lock seams.

- F. Pre-tin edges of metal sheet. Solder shop formed metal joints. After soldering, remove flux. Wipe and wash solder joints clean. Weather seal all joints.
- G. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.
- I. Form sheet metal pans pitch pockets 6-inch nominal size, with 3-inch upstand, and 4-inch flanges.
- J. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

3.04 INSTALLATION OF METAL WORK:

- A. General:
 - 1. Comply with details and profiles shown, and comply with SMACNA "Architectural Sheet Metal Manual" recommendations for installation of work.
 - 2. Separate dissimilar metals from each other by painting area of contact with heavy application of bituminous coating.
 - 3. Conceal fasteners and expansion provisions wherever possible. Fold back edges on concealed side of exposed edges to form a hem.
 - 4. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- B. Aluminum Work:
 - 1. Bed base members in roofing cement. Anchor and seal in accordance with manufacturer's instructions. Clean exposed surfaces promptly to prevent start of non-uniform oxidation or electrolytic action.
 - 2. Apply 15-mil dry film thickness bituminous coating to concealed aluminum surfaces that will be in contact with cementitious surfaces, dissimilar metals, wood or other absorptive substrates.
 - 3. Rivet or weld joints in uncoated aluminum where necessary for strength.
- C. Expansion Provisions:
 - 1. Provide for thermal expansion of all exposed sheet metal work exceeding 15'-0" running length, at 10'-0" maximum spacing, and located 2'-0" from corners and intersections, **except as otherwise indicated.**
 - 2. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
- D. Elastomeric Sealed Joints:
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant.
 - 2. Do not install sealant-type joints at temperatures below 40 deg. F.
- E. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2" except where pretinned surface would show in finished Work.
 - 1. Do not solder aluminum sheet.
 - 2. Stainless-Steel Soldering: Pretin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
 - 3. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Remove flux and spatter from exposed surfaces.

3.05 GENERAL INSTALLATION REQUIREMENTS:

- A. Comply with manufacturer's instructions and recommendations for handling and installation of flashing and prefabricated products.
- B. Coordinate the work with other work for correct sequencing. It is required that flashing be permanently water tight and not deteriorate in excess of manufacturer's published limitations.

- C. Conform to details included in the AISI, SMACNA, and NRCA manual.
- D. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- E. Apply plastic cement compound between metal flashings and felt flashings.
- F. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- G. Seal metal joints watertight.
- H. Connect downspouts to storm sewer system where indicated. Seal connection watertight.
- I. Seal metal joints watertight.

3.06 ROOF FLASHING INSTALLATION:

- A. Pipe of Post Counterflashing: install counterflashing umbrella with close-fitting collar with top edge flared butyl sealant. Extend a minimum of 4 inches over base flashing, install stainless-steel draw band and tighten.
- B. Counterflashing: Coordinate installation with installation of base flashing. Insert in reglets or receivers and fit tightly to base flashing. Extend 4 inches over base flashing. Lap joints a minimum of 4 inches and bed with elastomeric sealant.
- C. Roof penetration flashing: coordinate flashing with installation of roofing and other items penetration roof. Install as follows:
 - 1. Seal with butyl sealant and clamp flashing to pipes penetrating roof.

3.07 FIELD QUALITY CONTROL:

- A. Field inspection will be performed under provisions of Section 01400.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.08 SCHEDULE:

- A. GENERAL ROOF COMPONENTS:
 - 1. Base Flashing: Fabricate from the following material:
 - a. Aluminum: 0.040 inch thick
 - 2. Counterflashing: Fabricate from the following material:
 - a. Aluminum: 0.040 inch thick
 - 3. Roof-Penetration Flashing: Fabricate from the following material:
 - a. Stainless Steel: 0.0187 inch thick
- B. STEEP-SLOPE ROOF COMPONENTS:
 - 1. Apron, Step, Cricket and Backer Flashing: Fabricate from the following material:
 - a. Aluminum: 0.0320 inch thick
 - 2. Valley Flashing: Fabricate from the following material:
 - a. Aluminum: 0.0320 inch thick
 - 3. Drip Edges: Fabricate from the following material:
 - a. Aluminum: 0.0320 inch thick
 - 4. Eave and Rake Flashing: Fabricate from the following material:
 - a. Aluminum: 0.0320 inch thick

END OF SECTION 07600

SECTION 07720 - ROOF ACCESSORIES**PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. General: this section includes pre-manufactured accessories for exterior assemblies similar to roof construction and wall system termination. Any assembly that is an integral part of a roof or wall system must coordinate with that particular system and may be more defined in the associated Specification Section.
- B. Accessories shall include:
 - 1. Gutters and Downspouts
 - 2. Metal fascia and soffits
 - 3. Ridge Vents.
 - 4. Various Ventilators
- C. See Section 07600 – Sheet Metal Flashing and Trim for building elements that are formed in the field.

1.02 RELATED SECTIONS:

- A. See Division 4 for Masonry Accessories
- B. Section 05580 – Sheet Metal Fabrications
- C. Section 07600 – Flexible Sheet Flashing and Trim
- D. Section 07900 – Joint Sealants
- E. Section 09900 - Painting
- F. Division 15 - Mechanical: Pipe boots, and rooftop connections

1.03 REFERENCES:

- A. ASTM A167 - Stainless and Heat-Resisting, Chromium-Nickel Steel Plate
- B. ASTM A446 - Steel Sheet, Zinc coated, (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
- C. ASTM B32 - Solder Metal
- D. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate
- E. ASTM B370 - Copper Sheet and Strip for Building Construction
- F. ASTM B486 - Paste Solder
- G. FS)-F-506 - Flux, Soldering, Paste and Liquid.
- H. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant
- I. SMACNA - Architectural Sheet Metal Manual

1.04 QUALITY ASSURANCE:

- A. Gutter and Downspouts:
 - a. Conform to SMACNA Manual for sizing components for rainfall intensity determined by storm occurrence of 1 in 10 years.
- B. Provide the required coordination for the expansion joint cover with the particular roofing membrane being installed on the Project.
- C. Provide manufacturer's assurance that components meet or exceed material requirements and that the installer has the support of the manufacturer for each material being installed.
- D. Maintain one copy of each document on site.
- E. Perform work in accordance with AISI, SMACNA, NRCA standard details and requirements.

1.05 PERFORMANCE REQUIREMENTS:

- A. General: Fabricate and install Roof Accessories to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install Roof Accessories to comply with recommendations of FM Loss Prevention Data Sheet 1-49 for the following wind zone:
 - 1. Wind Zone 2: Wind pressures of 31 to 45 psf.

- C. **Thermal Movements:** Provide Roof Accessories which allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (range): 120 deg. F., ambient; 180 deg. F. material surfaces.
- D. Provide Roof Accessories which do not allow water infiltration to building interior.
- 1.06 SUBMITTALS FOR REVIEW:
- A. Submit under provisions of Section 01300.
 - B. Shop Drawings: Indicate locations, configurations, **jointing pattern**, and installation details.
 - C. Product Data: Provide data on prefabricated components.
 - D. Samples: Submit two samples, 12 inches long illustrating component design, finish, color, and configuration. **Special attention to soft-soldered joint execution.**
- 1.07 COORDINATION:
- A. Coordinate work under provisions of Section 01039.
 - B. Coordinate the work with downspout discharge pipe inlet and Storm Water System.
 - C. Coordinate expansion joint cover with roofing membrane and details.
 - D. Coordinate fascia, soffits and gutters with the roofing system as required.
 - E. Coordinate work of this Section with adjoining work of proper sequencing of each installation to ensure best-possible weather resistance and protection of materials and finishes against damage.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS:
- A. Subject to compliance with requirements, provide products as noted under the individual Material Installation sub-sections noted below in each Product category.
 - B. General: **Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.**
 - C. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.
- 2.02 MATERIAL- GENERAL:
- A. Aluminum Extrusions: ASTM B221, 6063-T5 alloy and temper, or as recommended by manufacturer for use intended and as required for proper application of finish indicated.
 - B. Aluminum Sheet: ASTM B209, alloy and temper recommended by aluminum producer and finisher for use intended and finish indicated, and with not less than the strength and durability of alloy and temper designated below:
 1. Alloy 5005-H14, with a min. thickness of 0.032 inch, for aluminum sheet with other than mill finish.
 - C. Insulation: Manufacturer's standard rigid or semi-ridged glass-fiber board of thickness indicated, or to comply with noted overall R-value.
 - D. Wood Nailers: softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWWA C2; not less than 1-1/2 inches thick
 - E. Fasteners: Same metal as being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material.
 - F. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork

2.03 ROOF ACCESSORIES:A. Roof /Eve Vents and accessories:

1. Passive - VentSure® Metal Square Top Vent by Owens Corning is suitable for up to 12:12 pitch and features a weather-resistant rolled flange. Similar to:
 - a. Aluminum and galvanized-steel construction
 - b. Promotes a cooler, drier attic
 - c. Large flange for easy installation
 - d. Suitable for up to 12:12 roof pitch
 - e. Min. 51 Square inches of free area
2. Roof vent pipe flashing:
 - a. Rustproof, galvanized base material
 - b. Flexible, sealing collar
 - c. Approved for Type-B installation
3. Continuous soffit/overhang ventilation
 - a. 8 foot lengths with min 35 square inches of free area.

B. Ridge Vents:

1. Plastic: High-density polypropylene or other UV-stabilized plastic designed to be installed under shingles at ridge.
2. Free area: provide at **least 12.5 square inches** of free area per lineal foot of ridge.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Shingle-Vent II by Air Vent, Inc.
 - b. Alcoa Building Products.
 - c. Cobra Ridge Runner by GAF.
 - d. or equal

C. Gutters, Downspouts, Brackets, and Accessories:

1. Fabricate formed Gutters and Downspouts in seamless lengths, with soft-soldered pre-fabricated corner units, end caps, outlets, and other accessories.
 - a. 4" x 6" K-style Gutters: Fabricated from alum.
 1. Gauge: 22ga.
 2. Downspout Outlets: Provide matching Downspout Outlets soft-soldered between Gutter and Downspouts.
 3. Corner Units: Provide matching Corner Units soft-soldered between Gutter runs wherever Gutters change direction.
 4. End Caps: Provide matching End Caps soft-soldered to Gutters wherever Gutters terminate.
 5. Refer to Drawings for additional information.
 - b. 4" x 4" Downspouts: Fabricated from type 304 Stainless Steel, with in No. 4 finish.
 1. Gauge: 26ga.
 2. Continuously solder the vertical seam in all Downspouts and orient Downspout to conceal seam against building face.
 3. For Downspouts on North Side of Building, provide heavy-gauge type 304 soft-soldered matching 4"x4" Stainless Steel Adapters with Debris Trap to discharge rainwater to underground storm water piping. Adapters shall be equal to Model 4426-DT by Piedmont Pipe, www.PiedmontPipe.com.
 4. For Downspouts on South side of Building, provide matching elbow sweeps to discharge rain water to grade.
2. Elevate back top edge at least 1" above front gutter rim for proper overflow drainage.
3. Accessories:
 - a. Provide continuous, removable, heavy-duty leaf screen with frame for each Gutter, full length. Note: Leaf Screens are not shown on the Drawings.

D. Drip Edges:

1. Fabricate formed Drip Edges in profiles shown in seamless lengths.
 - a. Drip Edges: Fabricated from type 304 Stainless Steel, with a No. 4 finish.
 - i. Gauge: 24ga.

ii. Refer to Drawings for additional information.

2.04 FINISHES - GENERAL:

- A. Finishes, General: Comply with NAAMM "Metal Finishes Manual" for recommendations on application and designations of finishes.
- B. Aluminum Finishes:
 - 1. Clear-Anodized Finish: Class I Architectural (film thicker than 0.7 mil) complying with AAMA 607.1.
 - 2. Baked Enamel Finish: Thermosetting-modified acrylic enamel primer and topcoat system complying with AAMA 603.8, except with a minimum dry film thickness of 1.5 mils, medium gloss.
 - a. Color: Match Architect's samples.
 - b. Color: As selected by Architect.

2.05 ACCESSORIES:

- A. General: Provide manufacturer's standard accessories designed and manufactured to match and fit roof edge treatment system indicated.
- B. Anchorage Devices: SMACNA requirements.
- C. Gutter and Downspout Supports: Brackets to match gutters.
- D. Fasteners: Stainless steel, with soft neoprene washers. Finish exposed fasteners same as flashing metal.
- E. Primer: Zinc chromate type.
- F. Protective Back Coating: FS TT-C-494, bituminous.
- G. Solder: ASTM B32; 50/50 type.
- H. Flux: FS O-F-506.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Verify that surfaces are ready to receive work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof edge system installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION:

- A. Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units. Coordinate with vapor barriers, roof insulation, roofing and flashing installation to ensure that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses, as well as inward and outward loading pressures.
 - 1. Except as otherwise indicated, install roof accessory items according to construction details of NRCA "Roofing and Waterproofing Manual."
- B. Clean exposed metal and plastic surfaces according to manufacturer's instructions. Touch up damaged metal coatings.
- C. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.
- D. Heat-and-smoke Vents: Locate, install and test according to NFPA 204M.
- E. Gutters:
 - 1. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
 - 2. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories. Slope gutters 1/4 inch per foot minimum.

3. Install running lengths to allow controlled expansion of movement of metal components in relation not only to one another, but also to adjoining dissimilar materials.
 4. Seal metal joints watertight.
 5. Connect downspouts to downspout boots connected to storm sewer system. Seal connection watertight.
- F. Where metal surfaces of units contact dissimilar metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces or provide other permanent separation as recommended by aluminum producer.
- 3.03 CLEANING AND PROTECTION:
- A. Clean exposed surfaces according to manufacturer's written instructions. Touch-up damaged metal coatings.

END OF SECTION 07720

SECTION 07900 - JOINT SEALANTS**PART 1 – GENERAL**1.01 **DESCRIPTION OF WORK:**

- A. Providing and installing a material to close joints between dissimilar materials.
- B. A 'soft joint' material such as caulk or sealant shall be installed between dissimilar materials wherever expansion/contraction or movements in adjacent materials may occur. Coordinate these joint materials with the Architect for colors.**
- C. The Contractor shall be responsible for coordinating appropriate joint material with substrates and movement characteristics.**
- D. Providing and installing a material to close joints required because of construction techniques and/or expansion/contraction requirements.
- E. Providing and installing all required back-up rods and accessories for caulking/sealant materials.
- F. This Section may include joint sealants as noted on the Documents and for the following locations that may occur:**
 - 1. Exterior Joints in vertical and non-traffic horizontal surfaces:
 - a. Control and expansion joints in masonry, cast-in-place concrete or stone
 - b. Joints in stonework not set with mortar, or as noted
 - c. Perimeters of all windows and door frames
 - d. Control/construction joints in overhead surfaces
 - e. Other locations as noted or required
 - 2. Exterior joints in horizontal traffic surfaces:
 - a. Horizontal joint whenever concrete sidewalks or steps abut the building structure at or near grade
 - b. Control and/or expansion joints in brick pavers and cast-in-place concrete. Coordinate with Civil Documents for information that may be required in lieu of information herein noted.
 - c. Control and expansion joints in other exterior material as noted herein and/or required
 - 3. Interior joints at surfaces as noted:
 - a. Control and/or expansion joints in gypsum board, tile, masonry, concrete and/or other wall construction material or interface between wall and floor
 - b. Control and/or expansion joints of concrete slabs not scheduled to receive additional floor finishes.
 - c. Joints/connections of all dissimilar materials
 - d. Acoustical sealant application for gypsum board system. See Section 09250 for additional information and/or requirements
 - e. Perimeter joint of all plumbing accessories and toilet fixtures to fixed construction
 - f. Perimeter joint of all thresholds, countertops, door and window frames
 - g. Other locations as noted or required

1.02 **PERFORMANCE REQUIREMENTS:**

- A. Provide exterior joint sealants that have been produced and installed to create and maintain a watertight, continuous seal without staining or deteriorating the substrates adhered to.
- B. Provide interior joint sealants (typically called as caulk) that have been produced and installed to maintain a continuous, water resistant seal and cause no staining of the substrates adhered to. Under most situations, caulks shall be paintable unless noted otherwise or matching the particular substrate in color.

1.03 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 07200 - Insulation
- B. Section 09250 - Gypsum Board Systems
- C. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

- D. Refer to Divisions 15 and 16 for joint sealers in mechanical and electrical work; for work coordinated with this section.

1.04 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
- B. Installer Qualifications: Firm with not less than five (5) years documented experience in successful installation of the work of this section and on projects similar in scope and type. Installer must be capable of tooling joints per the "Typical Caulk/Sealant Joints" detail found in the Drawings.

1.05 SUBMITTALS:

- A. Product Data: Submit manufacturer's product indicating sealant specifications, handling/installation/curing instructions and performance test data sheets, limitations and color charts.
 - 1. Submit descriptive data listing back-up material, bond-preventative material, primer for each type of surface, solvents, cleaning agents, and wetting agents as recommended by sealing compound Manufacturer.
 - 2. Manufacturer's printed instructions for each type of sealing compound to be used in the work covering surface preparation, mixing, recommended joint dimensions and sealing compound application.
- B. The contractor shall be responsible for coordinating the choice of manufacturer, with available colors choices, to meet the color requirements of the Project. **Therefore, the Architect shall be allowed to choose a manufacturer whose color is compatible for the particular Project and installation requirements.**
- C. Samples: **Provide accurate, material samples to the Architect for choice of sampling colors. Paper sample are not allowed.**
- D. Field Mock-up: Submit two (2) samples 6" long, minimum, illustrating a sample of the material (cured) in each color selected and specified tooling requirements. **Have at least two (2) samples prepared for each sealant color and condition** for approval by the Architect prior to installation. Provide a textured finish of sealant when specified.
- E. For exterior conditions: Install a sampling (mock-up) of at least two sealant colors for each application requirement as part of the Project.

1.06 PROJECT CONDITIONS:

- A. Weather Conditions: Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.
- B. Where possible, maintain temperature and humidity levels recommended by manufacturer during and after installation.
- C. Do not install solvent curing sealants in enclosed building spaces.

1.07 GUARANTY-WARRANTY:

- A. This Contractor shall and hereby does warrant, shall and hereby does guarantee all caulking work in this division against defective materials and workmanship for a specified period:
 - 1. Warranty period: **(2) years** from date of Substantial Completion.
- B. Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those failing in performance within warranty period.
 - 1. Warranty period: **20 years from date of Substantial Completion.**
- C. Issuance of final certificate of payment is contingent upon delivery to architect of said written Guaranty-Warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

- A. Acceptable Manufacturers - Subject to compliance with the following requirements, provide products by one of the following Manufacturers:
 - 4. Tremco, Inc.
 - 5. Dow Chemical
 - 6. Sika Corporation
 - 7. Polymeric Systems, Inc.
 - 8. Sonneborn Building Products Div., ChemRex, Inc.
 - 9. Pecora Corp.
 - 10. Or Architect approved substitution.
- B. Provide joint sealants, fillers and related materials that are compatible with one another and with the particular substrates, conditions of service and applications – as specified by sealant manufacturer based on testing and field experience.
- C. Proprietary names used below are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.

2.02 INTERIOR CAULKING/SEALANT - TYPICAL:

- A. **Typical Acrylic Latex Caulk:** All caulking compounds for interior use, except as otherwise stated in this Division or related referenced sections, shall be one-part, acrylic latex conforming to ASTM C-834, type OP.
 - 1. Caulking compound shall be acid resistant, waterproof, and paintable; shall not stain or injure materials in contact with same; shall not disintegrate at low temperature or liquefy at temperature of 140 degrees F.; shall not be affected by vibration.
 - 2. This material shall be used at interior areas for joints/interfaces of window/door frames, countertops, wall mounted accessories, precast concrete slabs, masonry walls and other, similar materials
 - 3. Manufacturer's products approved for use are:
 - a. Sonolac®, Sonneborn
 - b. AC-20 + Silicone, Pecora Corp.
 - c. Tremco Acrylic™ Latex, Tremco, Inc.
 - d. Or Architect approved substitution.
- B. **Acoustic sealants** shall conform to ASTM-D-217 and be a synthetic rubber as manufactured by Tremco or equal.
 - 1. Apply wherever interior partitions butt against exterior walls or drywall ceilings.
- C. **Ceramic Tile Sealant** joints in ceramic tile:
 - 1. caulk with a sealant of type as recommended by primary tile manufacturer and as complies with TCA Handbook for Ceramic Tile Installation. Refer to "Movement Joint Design Essentials EJ171-current edition in the TCA Handbook. Material may vary between vertical and horizontal applications and application of joint.
 - 2. Use sealants complying with ASTM C920 of the following types:
 - a. Type S – single-component sealant
 - b. Grade NS – non-sagging sealants for vertical surfaces
 - c. Grade P sealants for horizontal surfaces
- D. Provide and install all backer-rods and release tapes necessary for a complete installation of all types of caulk/sealants noted above.

2.03 EXTERIOR SEALANTS - TYPICAL:

- A. General: Provide manufacturer's standard, chemically curing elastomeric sealants as required for the particular type of installation and environmental conditions, and that comply with ASTM C 920 and other requirements indicated on each Joint Sealant Data Sheet for application use.
 - 1 Coordinate with the Manufacturer for the most appropriate material for the type of installation noted below.
 - 2 **The contractor shall be responsible for providing Data Sheets for each sealant choice for the various material/condition/environment conditions applicable.**

- B. Typical sealant conditions are noted below and shall use the materials following unless additional requirements are specified in the Documents:**
1. **General Construction** sealants shall be similar to:
 - a. Tremco 'Spectrem 3' Type S (single component), Grade-NS (non-sagging) or equal
 - b. Similar products of Dow Corning, Sika or DAP
 2. **On-Grade Joint** sealant associated with the building systems shall be one or two-part, self-leveling, pouring grade polyurethane appropriate for the particular material in contact to the sealant.
 - a. Typical of building to concrete-at-grade joints and other cast-concrete installations.
 - b. **All joints shall be tooled to force the sealant into contact with the substrate material.**
 - c. Coordinate with Architect for color matching to substrate.
 - d. Provide required backer-rod allowing sealant to comply with the manufacturer's thickness requirements for sealant application (typically 1/4" – 1/2" depth) and compression/elongation limitations of the particular installation.
 - e. An appropriate sealant as manufactured by:
 1. Tremco – THC 900/901
 2. Sika – Sikaflex 1c SL
 3. Pecora – NR-200
 4. Sonneborn – SL-2
 5. or equal

2.04 JOINT FILLERS, PAVEMENT TYPES:

- A. Joint fillers for typical concrete slab construction/control joints applications.
- B. Bituminous and Fiber Joint Filler: Provide resilient and non-extruding type pre-molded bituminous impregnated fiberboard units complying with ASTM D1751; FS HH-F-341, Type I; or AASHTO M213.

2.05 CELLULAR/FOAM JOINT FILLERS AND SEALANT BACKERS:

- A. Provide sealant backing of material and type that are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers.
- B. Typical materials are as follows. The contractor is responsible to coordinate with particular sealants and installation conditions:
 1. Closed-Cell Synthetic Rubber Joint Filler: Expanded synthetic rubber complying with ASTM D1056, Class SC-E (oil-resistant and medium swell), of 2 to 5 psi compression deflection (Grade SCE 41); except provide 13 to 17 psi compression deflection (Grade SCE 44) where filler is applied under sealant exposed to traffic. Provide as needed.
 2. Closed-Cell PVC Joint Filler: Flexible expanded polyvinyl chloride complying with ASTM D1667, Grade VE 41 BL (3.0 psi compression deflection); except provide higher compression deflection grades as may be necessary to withstand installation forces and provide proper support for sealants, if any. Provide as needed.
 3. Closed-Cell Semi-Rigid Plastic Joint Filler: Semi-rigid, compressible non-staining, closed-cell plastic joint filler, recommended by manufacturer where low modulus of elasticity is required, but suitable for retaining poured concrete. Provide as needed.
 4. Open-cell polyurethane foam
 5. Closed-cell polyethylene foam

2.06 ACCESSORIES:

- A. Joint Primer/Sealer: Non-staining type primer/sealer shall be as recommended by the sealant manufacturer for use on the type of substrate material encountered, and shall have been tested for staining, durability, and dirt pick-up on the surfaces to be primed or sealed.
- B. Joint Cleaner: Non-corrosive and non-staining type as recommended by sealant manufacturer; shall be compatible with joint forming materials.
- C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer to suit application. To be applied to sealant-contact surfaces where bond to

- substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
- D. Compression Seals: Manufacturer's standard, preformed, pre-compressed, open-cell foam sealant. It shall be a high-density urethane foam impregnated with a non-drying, water repellent agent in a factory produced pre-compressed size to fit joint widths required.
1. Density: 9-10 lb./cu. ft
 2. Backing: pressure sensitive adhesive, factory applied to one side, with protective wrapping.
 3. Color: Manufacturer's standard gray at building expansion joint, unless otherwise noted.
 4. Acceptable manufacturers:
 - a. Will-Seal Expanding Foam Sealant Tapes
 - b. Thermal Products, Inc.
 - c. or equal
- 2.07 COLOR SELECTION:
- A. Unless otherwise noted, color of sealant/caulk shall be selected by the Architect from each manufacturer's full range of available colors,
- B. Provide accurate, material samples to the Architect for choice of sampling colors. Paper sample are not allowed.**
- C. **Have at least two (2) samples prepared for each sealant color and condition** for approval by the Architect prior to installation. Sealant shall be applied to sample panel/wall when requested by Architect.
- D. Provide a textured finish of sealant when specified.

PART 3 - EXECUTION

- 3.01 INSPECTION:
- A. Installer shall verify that surfaces, substrates, joint openings and conditions under which joint sealer work is to be performed are satisfactory and ready to receive work. Installer shall notify Contractor in writing of unsatisfactory conditions. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Beginning of installation means Installer accepts existing surfaces and conditions.
- 3.02 PREPARATION:
- A. The surface of joints to be sealed with gaskets, sealants or caulking compound shall be cleaned free of loose particles, oil, grease, water, frost, surface dust, coatings, and other foreign matter which might impair performance of joint sealing materials.
1. Porous materials such as masonry and concrete shall be cleaned by sandblasting, mechanical abrading, acid washing, or a combination of these methods, as required to provide a clean, sound surface free of laitance, coatings and loose particles. When acid washing method is used, all traces of acid shall be removed from the surface of porous materials by immediately washing with fresh water and all metal and glass in adjacent construction shall be protected from the acid. Methods used shall be compatible with sealant materials and comply with manufacturer's recommendations.
- B. Prime or seal joint surfaces where required and where recommended by sealant manufacturer. Confine primer/sealant to areas of sealant bond. Do not allow spillage or migration onto adjoining surfaces.
- C. Verify that joint backing and release tapes are compatible with sealants.
- D. Measure joint dimensions and verify that joint filler and backer materials are sized to achieve joint width/depth ratios required by sealant manufacturer.
- 3.03 PROJECT CONDITIONS:
- A. Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.

- B. Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.
- C. Comply with manufacturer's printed instructions for sealant and sealant accessory preparation and installation, except where more stringent requirements are shown or specified or where appearance of joints is governed by the "Typical Caulk/Sealant Joints" detail found in the Drawings.
- D. Apply sealant within manufacturer's recommended temperature and humidity ranges. Exterior sealing compounds shall not be applied in damp or rainy weather nor until the surfaces of joints to be sealed have thoroughly dried from the effects of such weather. Condensation shall not be allowed to form on the joint surfaces to receive sealing compounds. Ventilation shall be provided as required to prevent the formation of condensation on such surfaces.

3.04 INSTALLATION:

- A. All interior joints shall be caulked with acrylic latex, except control joints and expansion joints in masonry wall; such joints shall be caulked with exterior type sealant. All exterior joints shall be sealed with exterior type sealant.
- B. Install bond breaker where joint backing is not used.
- C. Employ only proven installation techniques which will ensure that sealants are: deposited in uniform, continuous ribbons forced solidly into joint cavities so that full adhesion is achieved against contact faces of joint backing and joint faces; free from gaps, cracks, air pockets and foreign matter. For gun applications, select nozzle size to match joint width. **Except as otherwise indicated, finished sealant surfaces shall be struck flat no less than 1/8" below adjoining surfaces.** Where horizontal joints are between a horizontal and vertical surface, install joint to form a slight cove, so that joint will not trap moisture and dirt.
- D. Do not overheat or reheat hot-applied sealants. Discard overheated material.
- E. Install liquid-applied sealant to depths as shown, or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of beads (not applicable to sealants in lapped joints):
 - 2. For sidewalks, pavements and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures: fill joints to a depth equal to 75% of joint width, but neither more than 5/8" deep nor less than 3/8" deep.
 - 3. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
 - 4. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in the range of 75% to 125% of joint width.
- F. Do not allow sealants/caulks to overflow from confines of joints, to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by appropriate means necessary to eliminate evidence of spillage.
 - 1. Paper pressure-sensitive masking tape shall be placed on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer and sealing compound smears. Masking tape shall be removed within ten (10) minutes after the joint has been filled.
- G. All materials that have been over-applied in exposed-to-view locations or in locations being further treated by other trades shall be neatly trimmed with a knife edge or other trimming tool.

3.05 JOINT SHAPE:

- A. Tooling:
 - 1. Provide concave joint configuration per Figure 5A in ASTM C 962, unless otherwise noted.
- B. Tolerances:
 - 1. Set joint filler units at depth or position in joint as required coordinating with other work, including installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between ends of joint filler units.

2. As measured from any adjacent material face, edge, or line, tooled sealant/caulk joints shall not vary in depth by more than 1/16" in 1'-0".
 3. Exposed face of sealant/caulk shall be smooth and free of irregularities.
- 3.06 CLEANING AND ADJUSTMENT:
- C. At conclusion of caulking and when directed, clean off all excess material from adjoining surfaces and materials. Repair or replace all defaced or disfigured finishes caused by work of this section. Leave entire installation in perfect condition.
- 3.07 CURING AND PROTECTION:
- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.
 - B. Implement procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in a manner that will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants that are damaged or deteriorated during construction period.

END OF SECTION 07900

SECTION 08113 – FIBERGLASS ENTRY DOORS**PART 1 - GENERAL****1.01 WORK INCLUDED:**

- A. Furnishing all labor, materials and equipment to provide and install a Fiberglass Entry door where indicated on the Drawings, Door Schedule or specified herein.
- B. Door and frame to be a pre-hung assembly whenever possible.
- C. Provide all fasteners, anchors, flashings and other necessary hardware and accessories as required for secure and complete installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 08700 - Finish Hardware.
- B. Section 09900 - Painting

1.03 REFERENCES:

- A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- B. ASTM C236 - Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box.
- C. ASTM E413, ASTM E90 - Classification for Determination of Sound Transmission Class.
- D. ANSI A151.1 - Test Method for Swing Test and Twist Test After More Than 1 Million Cycles.

1.04 SUBMITTALS:

- A. Product Data: Submit manufacturer's product data certifying that products to be furnished comply with specified requirements.
- B. Certifications: Submit certified statement from the Manufacturer that the door furnished meets or exceeds requirements specific herein.
- C. Shop Drawings: Submit complete shop drawings to indicate door elevations, internal reinforcement, closure method, fabrications, including plans and large scale details of typical sections and connections.
 - 1. Provide layout, dimensions and identification of each unit corresponding to sequence of installation and erection procedures.
 - 2. Provide location and details of anchorage devices to be embedded in or fastened to other construction. Furnish templates if required for accurate placement.
- D. Submit manufacturer's installation instructions.
- E. Maintenance Data: Provide manufacturer's printed instructions on cleaning and maintenance as part of close-out documents, under provisions of Division 1.

1.05 QUALITY ASSURANCE:

- A. Conform to the requirements of ANSI/SDI-100 and ANSI A117.1.
- B. Manufacturer Qualifications: Manufacturer shall be a company specializing in manufacturing FRP (fiberglass-reinforced plastic) doors and frames specified in this section with a minimum of five (5) years documented experience.
- C. Single Source Responsibility: Obtain FRP (fiberglass reinforced plastic) doors and frames from a single manufacturer. Provide secondary accessories or components only as acceptable to or recommended by the manufacturer of the primary products.

1.06 REGULATORY REQUIREMENTS:

- A. Fire-rated door and panel construction shall conform to samples tested under ASTM E152, UL 10B and NFPA 252.
- B. Installed door and panel assembly shall conform to NFPA 80 for fire rated class as scheduled.
- C. Flame Spread: All FRP component parts, including the gel coat finish, shall have a flame spread classification of 25 or less per ASTM E84 and shall be self-extinguishing per ASTM E635 unless operating conditions dictate otherwise.

- 1.07 DELIVERY, STORAGE AND HANDLING:
A. Store doors and frames at the building site under cover. If the door wrapper becomes wet, remove immediately. Store in vertical position with the least possible angle.
- 1.08 COORDINATION:
A. Coordinate the work with required demolition and construction at existing door opening and door hardware installation.
- 1.09 WARRANTY:
A. Special Project Warranty: Submit a written warranty signed by the Manufacturer, the Contractor, and the Installer, guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributed to abnormal aging, without reducing or otherwise limiting any other rights to correction which the Owner may have under the contract documents.
B. The warranty shall include responsibility for removing and replacing other work as necessary to accomplish repairs or replacement of materials covered by the warranty.
C. Warranty period:
1. One (1) year after date of substantial completion against defects in materials and workmanship.
2. Ten (10) years after date of substantial completion against defects in door finish anti-corrosion properties.

PART 2 - PRODUCTS

- 2.01 MANUFACTURERS:
A. Acceptable Manufacturers: Subject to compliance with requirements, provide FRP doors and frames by one of the following:
1. **Therma-Tru** – Pulse Series.
2. Or Architect approved equal, under provisions of Section 01600.
- 2.02 DOORS:
A. Fiberglass door panels shall be made of fiberglass-reinforced plastics using resins and reinforcements tailored to the corrosive environment peculiar to the particular project. The door panels will be flush construction, having no seams or cracks in the face material. All mortises will be provided by the manufacturer. Mortises will be reinforced with a polyester based resin filled with 1/4" chopped glass strands and aerosol. Steel, wood or other reinforcement material other than a polyester based resin filled with 1/4" chopped glass strands and aerosol will not be accepted. Unless otherwise specified, door thickness shall be nominal 1 3/4" thick, with a 15 mils (\pm 3 mils.) color gel coat factory finish. Standard door face sheets shall be a maximum of .125" (1/25) in thickness.
1. Obtain templates from finish hardware supplier for factory preparation and pre-machining for all finish hardware.
B. Door Core: All voids between the door faces shall be completely filled with an approved material as appropriate for environmental and installation conditions.
1. Urethane core: 1 1/2" thick rigid block of urethane shall be fully laminated to the interior of the face sheets. The "K" factor shall be 14 BTU in./hr./sq.ft. 2-4 lb. density, or as required, shall be available.
A. Hardware Preparations: Obtain templates from finish hardware supplier for factory preparation and pre-machining for all finish hardware. All doors will be factory mortised and reinforced to allow field application of hinges, locks, pulls, bolts, etc. in accordance with details, approved hardware schedule and templates supplied by the hardware supplier.
- 2.03 DOOR PANEL CONFIGURATIONS:
A. "Ari" Model in 'Pulse' style panel, fiberglass door by Therma-Tru.

1. prep for Schlage lockset and deadbolt
2. non-ball-bearing, brushed nickel hinges
3. adjustable security strike plate (brushed nickel)
4. prep for peepholes
5. ADA accessible sill.

2.04 FRAME ACCESSORIES:

- A. Anchors: Frame anchors shall be of size, type and material appropriate for the environmental and installation conditions of this project. Frame anchors shall be concealed in finished installation. Frame units will be suitably prepared to meet the requirements of the installation.
- B. Frames that are fabricated from component parts, i.e., the stop unit is a separate structure which will be attached after the installation of the frame has occurred, shall require that a stop cap be provided to cover any exposed screw heads, etc.
- C. Frames that require masonry anchors and tabs shall be suitably prepared to ensure sound and reliable installation.
- D. Provide the required flashing for all frame installations to complete a water-tight assembly.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Installer must examine the conditions under which the Work of this section is to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.
- B. Beginning of installation means acceptance of existing conditions and substrates.

3.02 INSTALLATION:

- A. General: Comply with manufacturer's instructions except where more stringent requirements are shown or specified and except where project conditions require extra precautions or provisions to endure satisfactory performance of the work.
- B. Frame Installation: Install frames in accordance with ANSI/SDI-100 and manufacturer's written instructions.
- C. Door Installation: Install doors in accordance with ANSI/SDI-100 and as specified in NFPA standard N.80.
- D. Tolerances: Install products of this section to within tolerances which conform to Steel Door Institute's (SDI) requirements and manufacturer's standard.

3.03 ADJUSTING:

- A. Final Adjustments: Upon achieving substantial completion of work, adjust all operable components to ensure they are properly installed and functioning smoothly. Replace any component that cannot be adjusted for proper operation.

3.04 CLEANING:

- A. Upon completion, clean all surfaces that have become soiled or coated as a result of work of this section, using manufacturer's recommended methods that will not scratch or otherwise damage finish surfaces.
 1. For cleaning, use only products and techniques acceptable to the manufacturer of products being cleaned.

3.05 PROTECTION:

- A. General: Institute protective procedures and install protective materials as required to ensure that work of this section will be without damage or deterioration at substantial completion.

END OF SECTION 08113

SECTION 08211 - FLUSH WOOD DOORS**PART 1 - GENERAL**1.01. **SECTION INCLUDES:**

- A. Flush wood door panels
- B. Solid Core Wood (SCWD) Flush Wood Interior Door Panels
- C. Vision Panels (Door Lites)
- D. Transom panels.
- E. Louvers

1.02. **RELATED SECTIONS:**

- A. Section 06200 - Finish Carpentry
- B. Section 08710 - Door Hardware
- C. Section 08800 - Glazing
- D. Section 09900 - Painting

1.03. **REFERENCES:**

- A. ANSI A135.4 - Basic Hardboard.
- B. ASTM E152 - Methods of Fire Tests of Door Assemblies.
- C. ASTM E413 - Classification for Determination of Sound Transmission Class.
- D. AWI -Quality Standards of the Architectural Woodwork Institute.
- E. HPMA HP - Hardwood and Decorative Plywood.
- F. NEMA (National Electric Manufacturers Association) LD3 - High Pressure Decorative Laminates.
- G. NFPA 80 - Fire Doors and Windows.
- H. NFPA 252 - Standard Method of Fire Tests for Door Assemblies.
- I. UL 10B - Fire Tests of Door Assemblies.
- J. Warnock Hersey - Certification Listings for Fire Doors.
- K. Quality Standards:
 - 1. WDMA Industry Standard I.S. 1-A-04 (Window and Door Manufacturers Association)
 - 2. AWI Quality Standards 8th Edition, Version 2.0 2005.[OR] select AWI QCP program
 - 3. WI Manual of Millwork, 11th Edition, 2003
 - 4. ANSI A115. W Series, Wood Door Hardware Standards. (American National Standard Institute)
- L. Labeling Agencies
 - 1. Underwriters Laboratories, Inc. (UL) (Neutral pressure and positive pressure rated doors)
 - 2. Intertek Testing Services-Warnock Hersey (ITS-WH) (Ratings for both neutral and Positive pressure rated doors)

1.04. **SUBMITTALS FOR REVIEW:**

- A. Section 01300 - Submittals: Procedures for submittals.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining and finishing criteria, identify cutouts for glazing louvers and other accessories. Use same reference numbers for openings as scheduled on Drawings. Submit concurrently with frame and hardware submittal.
- D. Samples: Submit two samples of door construction, 6 x 9 inches in size, cut from top corner of door. Submit two samples of door veneer, 6 x 9 inches in size illustrating wood grain, stain color, and sheen.
- E. For Renovation projects where new doors and/or hardware are required to be installed in existing frames and/or doors, verify the fit of new doors and hardware in or on the existing frames and/or doors prior to submitting Shop Drawings.

1.05. **SUBMITTALS FOR INFORMATION:**

- A. Section 01300 - Submittals: Procedures for submittals.
 - B. Manufacturer's Installation Instructions: Indicate special installation instructions.
- 1.06. QUALITY ASSURANCE:
- A. Tolerances for Warp, Telegraphing, Squareness, and Pre-fitting Dimensions: WDMA I.S.1-A.
 - B. Identifying Label: Each door shall bear identifying label indicating:
 - 1. Door manufacturer.
 - 2. Order number.
 - 3. Door number.
 - 4. Fire rating, if applicable.
 - C. Fire-Rated Doors: Labeled by Intertek/Warnock Hersey.
 - 1. Construction Details and Hardware Application: Approved by labeling agency.
 - D. Positive Pressure Opening Assemblies: UBC 7-2-1997/UL 10C.
 - E. Perform work in accordance with AWI Quality Standard Section 1300, Custom Grade. Maintain one copy on site.
 - F. Finish doors in accordance with AWI Quality Standard Section 1500, grades identified in schedule.
 - G. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- 1.07. REGULATORY REQUIREMENTS:
- A. Fire Door and Panel Construction: Conform to ASTM E152 NFPA 252 UL 10B.
 - B. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as scheduled.
- 1.08. DELIVERY, STORAGE, AND PROTECTION:
- A. Section 01600 - Material and Equipment: Transport, handle, store, and protect products.
 - B. Package, deliver and store doors in accordance with AWI Section 1300.
 - C. Protect doors with resilient packaging sealed with heat-shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.
- 1.09. WARRANTY:
- A. Section 01700 - Contract Closeout. 01740 - Warranties and Bonds.
 - B. Provide warranty to the following term:
 - 1. Life of Installation: Interior and exterior doors.
 - C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 - PRODUCTS

- 2.01 MANUFACTURERS:
- A. Weyerhaeuser.
 - B. VT Industries
 - C. Eggers
 - D. Poncraft.
 - E. Oshkosh Door Company
 - F. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to the exclusion of equivalent products of other accepted manufacturers.
 - 1. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders.
 - 2. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.
- 2.02 WOOD DOOR PANEL TYPES:

- A. Interior Doors: widths per schedule x 6'-8" nominal height x 1-5/8" thick 5-ply agrifiber, particleboard core, structural composite lumber or, stave lumber door with Hardwood veneer, both faces.
 - 1. All interior doors are identical, except for swings. See the Drawings for swing information.
 - 2. Core Assembly: Stiles and Rails bonded to core.
 - 3. Face Assembly / Adhesive: Face and crossbands hot-pressed to core with Type 1 adhesive.
 - 4. Faces: Hardboard – Paint grade.
 - 5. Special Details: Machining for templated hardware and priming for field finishing.

- 2.03 WOOD DOOR PANEL CONSTRUCTION:
 - A. Core (Solid, Non Rated): AWI Section 1300, Particleboard or Staved Lumber Core as typical. Other construction shall be acceptable if equal to Standards.
 - B. Vertical stiles:
 - 1. Hardwood outer stile edge, matching the face veneer.
 - 2. Min. 1-1/8" thick
 - 3. laminated for improved screw holding and split resistance.
 - C. Rail edges:
 - 1. Top rail 1-1/4" min.
 - 2. Bottom rail 1-1/2" min.
 - 3. Laminated top and bottom rail.

- 2.04 FLUSH DOOR FACING:
 - A. Veneer Facing (Flush Doors): **Paint grade hardboard or veneer**
 - B. All edges to view shall have veneers to match face panels.

- 2.05 ACCESSORIES:
 - A. Door Lites:
 - 1. Provide wood frames for glazing openings as indicated in Door Elevations.
 - 2. Provide and install glazing as required by the Door Schedule and Code for particular applications.
 - B. Louvers:
 - 1. Roll formed steel, prime painted
 - 2. Louver blade of inverted V slats, sight and light proof: with a louver free area of 50 percent, with metal frame secured with tamper proof fasteners.
 - 3. provide screens for exterior installations
 - C. Provide removable hardwood stops to match the door specie.

- 2.06 FABRICATION:
 - A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.
 - B. Astragals for Fire Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge at mid-door thickness, specifically for double doors.
 - C. Sound Rating for Single Door Leaf and Frame Assembly: ASTM E413, minimum STC 35.
 - D. Provide lock blocks at lock edge and top of door for closer for hardware reinforcement.
 - E. Vertical Exposed Edge of Stiles: Of same species as veneer facing, for transparent finish.
 - F. Fit door edge trim to edge of stiles after applying veneer facing.
 - G. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.
 - H. Factory fit doors for frame opening dimensions identified on shop drawings.
 - I. Cut and configure exterior door edge to receive recessed weather stripping devices.
 - J. Factory Undercuts:
 - 1. Interior Doors: 3/4"
 - 2. Exterior Doors: Coordinate with Weather-Stripping.
 - K. Provide edge clearances in accordance with AWI 1600.

2.07 FINISH:

- A. Doors shall receive field finishing:
 - 1. Factory Finishing: AWS System 2, pre-catalyzed lacquer
 - a. Primer coat
 - b. Sanding: sand
 - c. Topcoat: 2 coats sprayed, enamel paint. **Rolling paint not allowed.**
- B. Site-finish doors in accordance with approved sample, to match existing door panels.
 - 1. Double-seal door top edge with color sealer to match door facing.

PART 3 - EXECUTION3.01. EXAMINATION:

- A. Section 01039 - Coordination: Verification of existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02. INSTALLATION:

- A. Install doors in accordance with manufacturer's instructions.
- B. Install fire rated and non-rated doors in accordance with AWI Quality Standard, NFPA 80 and to Warnock Hersey requirements.
- C. Trim non-rated door width by cutting equally on both jamb edges.
- D. Trim door height by cutting bottom edges to a maximum of 3/4 inch. Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- E. Machine cut for hardware.
- F. Coordinate installation of glass and glazing.
- G. Install door louvers plumb and level.

3.03. INSTALLATION TOLERANCES:

- A. Conform to AWI requirements for fit and clearance tolerances.
- B. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inches surface area.
- C. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inches surface area.
- D. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 x 84 inches surface area.

3.04. ADJUSTING:

- A. Adjust door for smooth and balanced door movement.
- B. Adjust closer for full closure.

END OF SECTION 08211

SECTION 08305 - ACCESS DOORS**PART 1 - GENERAL:**1.01 **WORK INCLUDED:**

- A. Furnishing and installing floor hatches as required or specified herein.
- B. Furnishing and installing access panels for walls and/or ceilings as located on drawings or required by MEP access - as specified herein.
 - 1. Provide handles as required.
 - 2. **Access doors shall be rated when installed in any rated partition or ceiling.**

1.02 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 08712 - Door Hardware.
- B. Section 09250 - Gypsum Drywall Systems
- C. Section 09900 - Painting
- D. Section 15000 - "Duct Accessories" for duct access doors.

1.03 **REFERENCES:**

- A. Insulated fire rated units for walls shall bear the Intertek/Warnock Hersey and/or Underwriters Laboratories, Inc. 1-1/2 hour "B" label with 250-temperature rise.
- B. Un-insulated fire rated units for walls only shall bear the Underwriters Laboratories, Inc. label for 1-1/2 hour "B" label with NO temperature rise.
- C. Fire rated units for ceilings shall bear the 1-hour combustible construction, 3-hour non-combustible construction label by Intertek/Warnock Hersey.

1.04 **QUALITY ASSURANCE:**

- A. Provide all access panels for the project by the same source and the same manufacturer.
- B. Fire Rated door assemblies that comply with NFPA 80 and are labeled by Underwriters Laboratories, Intertek/Warnock Hersey or other testing facilities acceptable to authorities having jurisdiction.
- C. Obtain design professional's approval of sizes that may vary slightly from those indicated when they are not in accordance to manufacturer's standards.

1.05 **SHOP DRAWINGS:**

- A. Submit shop drawings as directed in Division 1, Section 01340.

1.06 **INCONSISTENCIES:**

- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS:2.01 **MANUFACTURERS:**

- A. JL Industries – Product line in noted, but others are acceptable if equal.
- B. Larsen's
- C. Milcor
- D. Bilco Company
- E. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.

2.02 **FLOOR DOOR:**

- A. Provide and install a non-rated access door as required to suit accessibility and size requirements of equipment requiring access similar to:
1. J.L. Industries, AAF Series - model AAF-2424S. For non-rated floor assembly.
 2. The floor door shall be single leaf. It shall be pre-assembled from the manufacturer.
 3. Cover: Shall be 1/4" aluminum diamond pattern plate.
 4. Frame: Shall be 1/4" extruded aluminum with strap anchors bolted to the exterior.
 5. Hinges: Shall be specifically designed for horizontal installation and shall be bolted to the underside of cover.
 6. Lifting mechanisms: Cam-action hinges shall pivot on torsion bars to provide smooth, easy, and controlled cover operation throughout the entire arc of opening and to act as a check in retarding downward motion of the cover when closing.
 7. A removable exterior turn/lift handle with a spring loaded ball detent shall be provided to open the cover.
 8. Hardware:
 - a. Hinges: Cast steel cam-action hinges that pivot on torsion bars shall be provided.
 - b. Cover shall be equipped with a steel hold open arm that automatically locks the cover in the open position.
 - c. Cover shall be fitted with the required number and size of torsion bars.
 - d. **A Type 316 stainless steel snap lock with fixed handle shall be mounted on the underside of the cover.**
 - e. Hardware: Shall be type 316 stainless steel hardware for installation in corrosive environments.
 - f. Finishes: Factory finish shall be mill finish aluminum with bituminous coating applied to the exterior of the frame.
 9. 300 lbs./SF carrying capacity.
- 2.03 WALL ACCESS DOORS Provide and install a **non-rated** access door as required to suit accessibility and size requirements of equipment requiring access similar to:
1. J.L. Industries, model TM – Multi-Purpose w/ 1" trim.
 2. Flush door and frame with 16-gauge steel. Frame is to be applied to gypsum board surface – for "surface" frame installation.
 3. 10" x 10" door size (or as required in the Field) with screwdriver access point.
 4. Door sizes in excess of 16" x 16" shall have a snap-latch that is available either left or right-handed – unless noted otherwise.
 5. Provide concealed hinge.
 6. Gray baked enameled primer.
- 2.04 FABRICATION
- A. Manufacture each access panel assembly as an integral unit ready for installation.
 - B. Welded construction: Furnish with a sufficient quantity of 1/4" mounting holes to secure access panels to types of supports indicated.
 - C. Recessed panel: Form face of panel to provide specified recess for application of finish material. Reinforce panel as required to prevent buckling.
 - D. Furnish number of latches required to hold door in flush smooth pane when closed.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify conditions are ideal for suitable installation.

3.02 PREPARATION

- A. Advise installers of work relating to access panel installation including rough opening dimensions, locations of supports, and anchoring methods. Coordinate delivery with other work to avoid delay.

3.03 INSTALLATION

- A. Follow manufacturer's instructions for installing access panels.
- B. Set frames to proper alignment with the wall or ceiling.
- C. Position access panels for proper access to concealed equipment requiring access.

3.04 ADJUST AND CLEAN

- A. Adjust panel after installation for proper operation.
- B. Remove and replace panels or frames that are warped, bowed, or damaged.

END OF SECTION 08305

SECTION 08560 – VINYL WINDOWS**PART 1 - GENERAL**1.01 **SECTION INCLUDES:**

- A. Fixed Window Units.
- B. Fixed over Vented Awning Units
- C. **SilverLine 70 Series by Andersen is acceptable for size and configurations required of the Documents. Other manufacturer's line may be acceptable but it is the Contractor's responsibility to coordinate sizes if proposed.**

1.02 **RELATED DOCUMENTS:**

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification sections, apply to the work of this section.

1.03 **DESCRIPTION OF WORK:**

- A. Furnishing all labor, materials and equipment necessary to provide and completely install solid vinyl windows and accessories as shown on the Drawings, Window Schedules and as specified herein.
 - 1. Types of vinyl windows include:
 - a. fixed;
 - b. projecting (see Window Schedule for locations of "project out" and "project in" units);
 - c. units with fixed and projecting components;
- B. Work of this section may include removing existing windows, fixed glazing and fixed opaque infill panels (including any hardware, gaskets, caulking, setting blocks, etc.) scheduled to be replaced with new windows, glazing or panels. See Drawings and Window Schedule for locations.
 - 1. Do not damage existing structural steel framing system during removal work. New windows, fixed glazing and opaque panels are to be installed in existing openings in existing framing system.
- C. Provide all anchors, hardware and other accessories as required for secure and complete installation.
- D. Vinyl windows shall be pre-glazed to maximum extent possible. Glass and glazing materials, including insulating glass units and insulated opaque infill panels, are specified in Section 08800.
- E. Perimeter and joint sealants specified in Section 07900.
- F. Coordinate with the work of other sections and trades as required.

1.04 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 02072 - Building Demolition for Remodeling
- B. Division 4 – Masonry
- C. Section 07265 – Air Barriers
- D. Section 07600 – Sheet Metal Flashing and Trim
- E. Section 07900 - Sealants

1.05 **REFERENCES**

- A. American Society of Testing Materials (ASTM)
 - 1. ASTM F 588- Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact
 - 2. ASTM B 633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel
 - 3. ASTM B 766 - Specification for Electrodeposited Coatings of Cadmium
 - 4. ASTM D 638 - Test Method for Tensile Properties of Plastics
 - 5. ASTM D 4216 - Specification for Rigid Poly (Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly (Vinyl Chloride) (CPVC) Building Products Compounds
 - 6. ASTM D 4726 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Exterior-Profile Extrusions Used for Assembled Windows and Doors

7. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings
8. ASTM E 2068 - Standard Test Method for Determination of Operating Force of Sliding Windows and Doors
9. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation
- B. American Architectural Manufacturers Association (AAMA)
 1. AAMA 701/702 - Combined Voluntary Specification for Pile Weather strip and Replaceable Fenestration Weather seals
- C. IGCC/IGMA Insulated Glass Certification Council/Insulating Glass Manufacturers Alliance.
 1. IGMA TM-3000 – North American Guidelines for Sealed Insulating Glass Unit for the Commercial and Residential use.
- D. Window and Door Manufacturers Association (WDMA)
 1. AAMA/WDMA/CSA 101/1.S.2/A440-08 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors

1.06 SYSTEM PERFORMANCE REQUIREMENTS:

- A. Design Requirements: The design wind pressure for the project will be no less than per local building codes. The window manufacture shall meet or exceed structural requirements in relation to wind loading at the project site. All structural components, including meeting rails and mullions, shall be designed accordingly.
- B. Air, Water, and Structural Performance Requirements: When tested in accordance with AAMA 101-93 (current edition), windows shall meet or exceed performance criteria for AW60 Grade.
 1. Laboratory Test Size: Perform all tests unless otherwise noted on the minimum test size specified in AAMA 101 (current edition) for AW grade. “Downsize” testing will not be acceptable.
 2. Air Test Performance Requirements: Air infiltration maximum 0.10 cfm per foot of crack length at operable units and 0.06 cfm/sq ft for fixed units at 6.24 psf pressure differential when tested in accord with ASTM E283 (“Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors”).
 3. Water Test Performance Requirements: No uncontrolled water leakage at 12.00 psf pressure differential with water application rate of 5 gallons/hr/sq ft when tested in accord with ASTM E331.
 4. Structural Test Performance Requirements:
 - a. Uniform Load Deflection Test:
 - 1) No deflection of any unsupported span of test unit (meeting rails, muntins, frames, mullions, etc.) in excess of L/175 at both a positive and negative load of 60 psf (design test pressure) when tested in accord with ASTM E330 (“Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference”).
 - b. Uniform Load Structural Test:
 - 1) Unit to be tested at 1.5 x design test pressure both positive and negative, acting normal to plane of wall in accord with ASTM E330.
 - 2) No glass breakage, permanent damage to fasteners, hardware parts, damage to make window inoperable or permanent deformation of any main frame or ventilator member in excess of 0.2% of its span.
- C. Condensation Resistance and Thermal Transmittance Performance Requirements:
 1. U-Value Requirements:
 - a. Perform test in accordance with AAMA 1503.1 procedure and on the configuration specified therein. When necessary, supplemental finite element computer thermal modeling to be per Frame 4.0 and Window 3.1 as approved by NFRC.
 - b. Project-Out Awning & Project-In Hopper Thermal Transmittance (“U” value): Maximum 0.63 BTU/hr/sf/deg F at 15 mph exterior wind.
 2. CRF Class Requirements:
 - a. Perform test in accord with AAMA 1503.1.

- b. Project-Out Awning & Project-In Hopper Condensation Resistance Factor Requirements (CRF) minimum 56 (frame) and (CRF) minimum 52 (glass).
 - D. Life Cycle Testing:
 - 1. When tested in accordance with AAMA 910-93, there is to be no damage to fasteners, hardware parts, support arms, activating mechanisms or any other damage that would cause the window to be inoperable at the conclusion of testing. Air infiltration and water resistance tests shall not exceed the primary performance requirements specified.
- 1.07 SUBMITTALS:
- A. General Requirements: Provide submittals in a timely manner to meet required construction completion schedule. Shop drawings must be prepared wholly by the window manufacturer.
 - B. Product Data: Submit product data for each product specified showing compliance with specified requirements.
 - C. Shop Drawings: Shop drawings shall include field verified wall and framing opening dimensions, layout, profiles, product components including anchorage, accessories, finish and colors. Show installation details, including preparatory work, sequencing and required coordination with other trades.
 - D. Samples:
 - 1. Components: Submit samples of anchors, fasteners, hardware, assembled corner
 - 2. Finish: Submit window finish samples for Architect's approval.
 - E. Quality Assurance:
 - 1. Certified independent laboratory test reports verifying compliance with all test requirements of 1.04 "System Performance Requirements".
 - 2. Manufacturer's installation instructions.
- 1.08 QUALITY ASSURANCE:
- A. Manufacturer: Company specializing in vinyl window manufacturing with ten (10) years minimum documented experience.
 - B. Qualifications: Company specializing in installing vinyl windows with five (5) years minimum documented experience on projects of similar scope. Window manufacturer will verify the competence of the installer, and insure they are an approved installing dealer.
- 1.09 DELIVERY, STORAGE AND HANDLING:
- A. Ordering: Comply with window manufacturer's ordering instructions and lead time requirements to avoid construction delays.
 - B. Materials will be packed, loaded, shipped, unloaded, stored and protected in accordance with AAMA CW-10 and manufacturer's instructions.
 - C. Protect all window materials adequately against damage from the elements, construction activities and other hazards before, during and after installation.
- 1.10 SITE CONDITIONS:
- A. Verify existing conditions.
 - B. Field Measurements: Verify actual measurements of new and existing openings by taking field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
- 1.11 WARRANTY:
- A. Vinyl Window Glass and Glazing Warranty:
 - 1. Windows: Submit a written non-pro-rated warranty, executed by the window manufacturer that guarantees materials and workmanship for ten (10) years. The warranty shall include window extrusions, weatherstripping, trim finish and all hardware supplied by the window manufacturer. The window manufacturer's warranty will cover all on site labor to repair or replace all defective parts for the entire 10-year warranty term.
 - 2. Factory Installed Insulating Glass: Submit a written non-pro-rated warranty, executed by the window manufacturer that guarantees insulated glass against failure of hermetic seal

- for ten (10) years. The window manufacturer's warranty will guarantee to provide insulating glass to replace failed units for the entire 10-year warranty term.
3. Terms: The warranty must be direct from the manufacturer to the owner. Warranty cannot be pro-rated. "Pass-through" warranty will not be accepted. A copy of the manufacturer's warranty must accompany all bids.
 4. Financial Responsibility: Upon request, the window manufacturer must provide a financial statement indicating proof of financial responsibility. Window manufacturers with less than ten (10) years of experience; or under financial restructuring of bankruptcy protection must provide material, performance and maintenance bonds.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide vinyl windows by one of the following:
 1. **SilverLine by Andersen: 70 Series Fixed/Awning (Fixed-over-Awning) and Single Picture (Fixed) Windows as selected to meet Exterior Elevations – are the Basis of the Design.**
 2. Other manufacturers are approved as long as the Contractor can coordinate sizes and details to conform:
 - a. NRG Inc., "Royal-Tech® Crown Series II
 - b. CertainTeed Corporation,
 - c. Architect approved substitution under provisions of Section 01600. **The Contractor shall be responsible to coordinate sizes of designed windows with Manufacturer's stock sizes if windows other than Andersen 70 Series are selected by the Contractor.**
 3. Products of named manufacturers are not required to exclusion of equivalent products of other accepted manufacturers.

2.02 COMPONENT REQUIREMENTS:

- A. Hardware:
 1. All aluminum components 6063-T5 or -T6.
 2. Locking handles, roto operators, and keepers shall be die cast white bronze.
 3. Hardware Options:
 - a. Hinges: Four-bar hinges, concealed type.
 - b. Locks: Locking cam handles, standard and Ring handles. Single point keepers.
 - c. Operators: Dual arm rotos.
 - d. Pulls: Pole rings, pole operators.
- B. Sealants:
 1. Nonworking Joints: Sealant shall comply with AAMA 800.
 2. Window Components: Sealant shall be suitable for application specified and as tested and approved by window manufacturer.
- C. Glass, Insulating Glass Units & Opaque Infill Panels:
 1. Sealed insulating glass shall meet ASTM E 774, Class A.
- D. Glazing:
 1. Glazing shall be accomplished from the interior by use of extruded PVC snap-in glazing beads.
 2. The beads will have integral, co-extruded, dual durometer glazing gasket. The size of bead shall vary to accommodate the type and size of glass specified.
 3. A pre-formed glazing tape will be applied to the fixed glazing leg to form a water tight seal to the exterior.

2.03 FABRICATION:

- A. General:

1. Finish, fabricate and shop assemble frame and sash members into complete windows under the responsibility of one manufacturer. Trim and accessory components (i.e. square trim, insect screen frames, etc.) shall be fabricated, finished and shop assembled to the same standards of and by the primary window manufacturer.
 2. No bolts, screws or fastenings to bridge thermal barriers or impair independent frame movement.
 3. Fabricate to allow for thermal movement of materials when subjected to a temperature differential from -30 degrees F to +180 degrees F.
- B. Frames: All corners are to be miter cut and fusion welded. Welds are to be dressed and finished to match the surrounding surfaces; a baffled internal weepage system shall be incorporated in both frame and sash members; then sealed weather-tight.
- C. Thermal Break Performance:
1. Allowable air filtration, at 15mph is (Slider/.06 cubic feet, Double Hung/.05 cubic feet
 2. Quality assurance records must be maintained and available as requested.
- D. Weatherstripping:
1. All operating sash shall be double and triple weatherstripped with polypropylene pile or Q-Lon weather seal as shown in the drawings.
- E. Insect Screens:
1. Provide flat surface-mounted insect screen with two (2) clips at each jamb for each operable vent. Frame finish to be a baked enamel finish match the window finish. See Item A above for fabrication requirements.

2.04 FINISHES:

- A. All window members shall have an integral White color throughout.

PART 2A - UNIT CONFIGURATION BY WINDOW TYPE:

2A.01 FIXED and FIXED/CASEMENT COMBO WINDOWS UNITS:

A. WINDOW SERIES:

1. Silver Line Building Products, 70 Series New Construction Fixed window over vented awning and/or fixed units.

B. COMPONENTS

1. Vinyl Extrusions: Multi-chamber extrusions of impact-resistant exterior-grade rigid polyvinyl chloride (PVC) complying with ASTM D 4726, ASTM D 4216 and ASTM D 638 standards.
2. Insulating Glass Unit: Unit thickness 5/8 inch:
 - a. Insulating Glass products shall be permanently marked with warranty certification label of IGCC®/IGMA® Certification Program.
 - b. Insulating Glass shall comply with the ASTM E 2190 standard.
 - c. Insulating Glass type selection shall comply with the ASTM E 1300 standard.
 - d. Air Chamber: Hermetically sealed space between panes. Clear Glass is standard with Low-E.
 - e. Low conductance spacer.
3. Screens: Installable from interior side, providing only ventilation and reasonable insect control when operable sash is in open position: re-screenable using fiberglass mesh, 16 x 18 gauge, secured in channel of aluminum box frame with continuous vinyl spline; frame color matching frame and sash color.
4. Operating Hardware: Types for specified operable-sash windows; sight-exposed hardware of UV-stabilized, engineered plastic; color matched to vinyl extrusions for uniform appearance.
5. Fasteners: All screws and other miscellaneous fastening devices incorporated shall be of aluminum, stainless steel, or other non-corrosive material compatible with vinyl extrusions. Cadmium or zinc plated steel, where used, shall be in accordance with ASTM B 766 or ASTM B 633. Nickel or chrome plated steel, where used, shall be in accordance with ASTM B 456.

- 6. Weatherstripping: Types for specified operable sash windows and operable doors.
- C. Configurations:
 - 1. Windows must be fixed unit with vented awning unit operable and able to tilt outward.
- D. Color: White standard.
- E. Styles and Sizes: As indicated on drawings.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Installer must examine the conditions under which the Work of this section is to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.
 - 1. Verify that the openings into which the windows will be installed are the correct size to permit installation of the new windows according to the manufacturer's installation instructions.
- B. Beginning of installation means Installer accepts existing conditions.

3.02 INSTALLATION:

- A. Install vinyl windows utilizing skilled tradesmen in exact accordance with approved shop drawings, manufacturer's instructions and Specifications.
- B. Align window frame plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent work.
- C. Anchor window units securely to structure.
- D. Coordinate attachment and seal of air and vapor barrier materials and flashings.
- F. Pack fibrous insulation in shim spaces at perimeter to maintain continuity of thermal barrier.
- G. Install perimeter sealant, backing materials, and installation requirements in accordance with section 07900. Apply sealant to ends of sill for watertight seal.
- H. Adjust operable hardware for smooth operation and operable sash tight, proper fit of sash.

3.03 CLEANING & PROTECTION:

- A. Remove protective material from pre-finished vinyl surfaces.
- B. Clean installed windows, inside and out, promptly after installation according to window manufacturer's recommendations. Remove excess glazing and joint sealants, dirt, and other substances from vinyl surfaces without marring surface. Use cleaning agents or solvents only as recommended by window manufacturer. Take care to clean in corners.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant and window manufacturer.
- D. Institute protective measures and other precautions required to assure that vinyl windows will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION - 08560

SECTION 08712 - DOOR HARDWARE**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
 - 1. Hardware for swinging Fiberglass and Wood Door Openings.
 - 2. Field modification and preparation of existing doors and frames for new hardware being installed. **Provide fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preparations.**
- B. Work Furnished But Installed Under Other Sections:
 - 1. Furnish templates to Sections 08211 - Flush Wood Doors for door and frame preparation.
- C. Related Sections:
 - 1. Section 06100 – Rough Carpentry
 - 2. Section 06200 – Finish Carpentry
 - 3. Section 08200 – Flush Wood Doors
 - 4. Section 08113 – Fiberglass Doors

1.02 REFERENCES

- A. Use the following references to properly detail, schedule, furnish and install finish hardware items.
 - 1. NFPA 80 – Standard for Fire Doors and Other Opening Protectives (2007)
 - 2. DHI Installation Guide for Doors and Hardware (1984)
 - 3. DHI Sequence and Format for the Hardware Schedule (1996)
 - 4. ANSI A117.1 Accessible and Usable Buildings and Facilities (2003)
 - 5. ANSI/BHMA A156.4 – Door Controls – Closers (2013)
 - 6. ANSI/BHMA A156.2 – Bored and Preassembled Locks and Latches (2011)
 - 7. ANSI/BHMA A156.18 – Materials and Finishes (2012)

1.03 SUBMITTALS

- A. Schedule:
 - 1. Provide submittals in accordance with 01 33 00 – Submittal Procedures.
 - 2. Provide hardware schedule in vertical format on 8-1/2-inch by 11-inch paper for electronic format. Conform to DHI publication Sequence and Format for Hardware Schedule using Architect's door numbers and hardware set numbers.
 - 3. Provide elevation drawings for openings with electrical hardware and access control devices with each hardware schedule. Include illustration of opening, operational description, electrified hardware components, legend, approximate mounting location and size of enclosures, size and quantity of conductors, facility name and date.
- B. Product Data: Provide one set of manufacturer's catalog and technical data for each hardware item used, highlighting design, function, fasteners, accessories, and options to facilitate review with each hardware schedule submitted.
- C. Templates: Provide two sets of manufacturer's templating information for mortised and template hardware upon receipt of approved hardware schedule to the door and frame supplier(s). Include requirements for internal reinforcements required for surface mounted hardware.
- D. Keying Schedule: Arrange meeting with Owner, Architect and finish hardware supplier to determine keying requirements immediately upon receipt of finish hardware schedule.

1.04 CLOSEOUT SUBMITTALS

- A. Furnish operations and maintenance manual in accordance with Section 01 78 28 – Operations and Maintenance Data and as follows:
 - 1. Furnish one copy of manual at date of Substantial Completion in a 2-1/2-inch thick binder labeled with project information, date and name and contact information for the hardware supplier.
 - 2. Include in manual:

- a. Copy of approved hardware schedule, including door numbers and locations. Highlight fire rated door to aid in annual fire door inspection.
- b. Copy of approved keying schedule.
- c. Catalog data for each product.
- d. Parts list for locksets, exit devices, and door closers.
- e. Installation templates and instructions.
- f. Warranty information.
- g. Name, address, and phone number of local representatives for each manufacturer.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Materials:

1. Screws and Fasteners: Fifty of each screw and fastener required for general maintenance of hinges, locks, closers, exit devices, and sealing systems.
2. Deliver to Owner remaining finish hardware fasteners and special installation tools upon completion of Project.

1.06 QUALITY ASSURANCE

A. Supplier:

1. Furnish hardware from recognized supplier who has warehousing facility within 100 miles of project location, and who has actively supplied hardware for similar projects in the vicinity for a minimum of five years.
2. Supplier shall employ an Architectural Hardware Consultant (AHC), as certified by Door and Hardware Institute, on staff full time to administer and supervise project.

B. Installer: Install hardware using installers who have actively installed commercial door hardware for a minimum of five years, and are familiar with hardware installation of type required on this Project.

C. Pre-Installation Meeting:

1. Prior to installation of hardware, arrange for manufacturer's representatives of locksets, door closers, and exit devices to hold a jobsite meeting to instruct the installing personnel on the proper installation of their products.
2. Send a letter of compliance, indicating when this meeting was held, and who was in attendance, to the Architect and Owner.

D. Fire Rated Door Openings:

1. Comply with NFPA 80.
2. Furnish nationally recognized testing agency label or stamp on hardware for labeled openings.
3. Only labeled locks or latches or fire exit hardware can be used on fire rated openings.
4. Where UL requirements conflict with Drawings or Specifications, furnish hardware conforming to the UL requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Jointly check in hardware, upon delivery to jobsite, against approved hardware schedule with hardware supplier. Record shortage or damage and replace or repair as necessary.
2. Deliver hardware to be installed during fabrication of doors and frames, to manufacturer.

B. Storage:

1. Store hardware in a secure, dry, temperature controlled room on shelving to protect against loss, theft and damage.
2. Store items too long for shelving on pallet, off the floor.

C. Marking and Packaging:

1. Deliver hardware to jobsite in manufacturer's original packaging marked to correspond with approved hardware schedule with Architect's door numbers and hardware sets.

2. Mark all locksets, exit devices, cylinders, auxiliary hardware and key switches with keyset symbol.
3. Replace any wet or damaged packaging with new.

1.08 WARRANTY

- A. Furnish warranties in accordance with Section 01 78 36 – Warranties. Extended or limited warranties shall be as follows:
 1. Furnish minimum ten year factory warranty on door closers, against defects in material and workmanship, from date of substantial completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The following manufacturers' are acceptable for use on this project. Provide like items of hardware from one of the manufacturers listed.

| | |
|-----------------------------|---|
| 1. Hinges | Stanley, Hager, McKinney |
| 2. Locks and Latchsets | Stanley Commercial, Schlage, Corbin Russwin |
| 3. Cylinders and Cores | Stanley Commercial – Best Keyway |
| 4. Surface Door Closers | Stanley Commercial, LCN, Corbin Russwin |
| 5. Exit Devices | Stanley Commercial, Von Duprin, Sargent |
| 6. Overhead Stop/holders | ABH, Glynn Johnson, Rixson |
| 7. Protection Plates | Trimco, Burns, Hiawatha |
| 8. Wall/Floor Stops | Trimco, Burns, Hiawatha |
| 9. Thresholds and Gasketing | National Guard, Reese, Pemko |
| 10. Silencers | Trimco, Burns, Hiawatha |
- B. Submit requests for substitution in accordance with Section 01 25 13 Product Substitution Procedures as follows:
 1. Provide catalog data with product information highlighted or bubbled to facilitate review. Product must meet or exceed quality level or design intended and/or function established by specified products.

2.02 MATERIALS

- A. Screws and Fasteners:
 1. Provide manufacturer's recommended fasteners of proper type, material and finish.
 2. Provide self-tapping screws for sweeps and stop applied weatherstripping.
 3. Utilize through-bolts for the attachment of door closers and exit devices on non-reinforced doors only. Finish: match door face.
 4. Exposed screw heads: phillips-head type.
- C. Hinges:
 1. Type:
 - a. Five-knuckle, full mortise, plain bearing.
 - b. Furnish heavy weight hinges on heavy doors and doors expected to have high frequency use.
 2. Quantity:
 - a. One pair of hinges for all doors up to 5 feet high. Furnish one additional hinge for every 2'-6" in height or fraction thereof.
 3. Size:
 - a. For 1-3/8-inch thick doors up to 3 feet wide 3-1/2-inches high
 - b. For 1-3/4-inch thick doors up to 3 feet wide: 4 1/2-inches high
 - c. For 1-3/4-inch thick doors over 3 feet wide: 5-inches high
 - d. For all doors over 1-3/4-inches thick: 5-inches high
 - e. Size in width shall minimally clear door trim.
 4. Application:
 - a. NRP (non-removable pin) at exterior doors and reverse bevel doors with locking hardware.
 5. Acceptable manufacturers and types:

| | | | |
|-----------------|---------|-------|----------|
| Type | Stanley | Hager | McKinney |
| Standard Weight | F179 | 1279 | T2714 |

D. Locksets:

1. Cylindrical Locks:

- a. Conform to ANSI/BHMA A156.2, Series 4000 Operational Grade 1.
- b. Latchbolt with appropriate throw for fire rated doors and pairs of doors in accordance with manufacturers listing.
- c. Lock functions as specified in hardware schedule.
- d. Lever design: Sierra €
- e. Backset: 2-3/4-inch
- f. Strike single door: ANSI 4-7/8-inch with proper lip length to minimally clear trim.
- g. Strike pair of doors: flat lip strike sized to fit flush with face of door.
- h. Furnish wrought strike box.
- i. Acceptable manufacturers and types:

| | | |
|--------------------|-----------|----------------|
| Stanley Commercial | Schlage | Corbin Russwin |
| QCL200 Series | AL Series | CL3800 Series |

2. Cylinders:

- a. Provide mortise and rim cylinders and cores from same manufacturer as locksets for all locksets, exit devices, cylinder dogging, key switches and auxiliary hardware.
- b. Appropriate cam and blocking rings for proper installation.

E. Keys & Keying

- 1. Cylinders: 6-pin, interchangeable core and keyed into a BEST factory registered Masterkey System.
- 2. Provide construction cores and keys during construction period. Construction control and operating keys and cores are not part of permanent keying system or furnished on same keyway (or key section) as permanent keying system.
- 3. Permanent Keys and Cores: Prepare permanent cores and keys in accordance with keying schedule. Provide Masterkeys and other Security Keys.
- 4. Furnish keys in the following quantities:
 - a. 4 each Masterkeys per new Masterkey set.
 - b. 2 each Change keys each keyed core.
 - c. 6 each Construction masterkeys.
 - d. 2 each Construction Control keys.
 - e. 2 each Control keys.
- 5. Install permanent cores in locksets.
- 6. Return construction cores to Hardware Supplier.

F. Exit Devices:

- 1. UL-listed for fire at fire door assemblies, and UL listed for panic at non-rated door assemblies.
- 2. Size exit devices to proper door width and height.
- 3. LBR (less bottom rod) where scheduled to eliminate use of floor mounted strikes.
- 4. Cylinders for exit devices with cylinder dogging or locking trim.
- 5. Strike: as recommended by manufacturer.
- 6. Lever design: To match lockset trim.
- 7. Acceptable manufacturers and types:

| | | |
|--------------------|------------|-----------|
| Stanley Commercial | Von Duprin | Sargent |
| QED100 Series | 98 Series | 80 Series |

G. Exterior Surface Door Closers:

- 1. Conform to ANSI/BHMA A156.4 Grade 1.
- 2. Heavy duty cast aluminum door closers
- 3. Furnish manufacturers recommended size, arms and configuration for door and frame application required.
- 4. Furnish brackets, spacers, support shoes, and plates for complete and proper installation.
- 5. DA (delayed-action) at toilet room doors and as scheduled.

6. Acceptable manufacturers and types:

| | | |
|---------------|-------------|----------------|
| Stanley | LCN | Corbin Russwin |
| QDC200 Series | 1460 Series | DC3000 Series |

H. Interior Surface Door Closers:

7. Conform to ANSI/BHMA A156.4 Grade 1.
8. Standard duty cast aluminum door closers
9. Furnish manufacturers recommended size, arms and configuration for door and frame application required.
10. Furnish brackets, spacers, support shoes, and plates for complete and proper installation.
11. DA (delayed-action) at toilet room doors and as scheduled.

12. Acceptable manufacturers and types:

| | | |
|---------------|-------------|----------------|
| Stanley | LCN | Corbin Russwin |
| QDC300 Series | 1070 Series | DC4600 Series |

I. Overhead Door Stop:

1. Provide overhead stop or overhead stop/holder for interior doors as specified. Provide overhead stop for interior doors and at any door that swings more than 120 degrees before striking a wall, open against equipment, casework, sidelights, and/or where conditions do not allow a wall stop or a floor stop presents a tripping hazard.
2. Where overhead holders are specified provide friction type at doors without a closer and positive type at doors with a closer.
3. Acceptable manufacturers:

| | | |
|-------------|-----------|---------------|
| ABH | Rixson | Glynn Johnson |
| 4420 Series | 10 Series | 450 Series |

J. Door Trim:

1. Provide push plates 6 inches wide x 16 inches high x 0.050 inch thick and beveled 4 edges. Where width of door stile prevents use of 6 inches wide plate, adjust width to fit.
2. Provide pull plates 4 inches wide x 16 inches high x 0.050 inch thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches wide plate, adjust width to fit.
3. Acceptable manufacturers:

| | | | |
|------------|---------|-------|-----------|
| Type | Trimco | Burns | Hiawatha |
| Push | 1001-9 | 56 | 200H |
| Pull Plate | 1017-3B | 5425B | 200Fx523A |

K. Protection Plates:

1. Where bottom rail allows, furnish 10-inch high kick plates and 10-inch high mop plates.
2. Material: 0.050-inch thick stainless steel plates with four beveled edges.
3. Width: 2-inch less door width on stop (push) side and 1-inch less door width on face (pull) side.
4. Both sides of doors where specified.
5. Countersink screw heads at wood doors.
6. Acceptable manufacturer and types:

| | | |
|--------|-------|----------|
| Trimco | Burns | Hiawatha |
| K0050 | KP50 | KP |

L. Door Stops:

1. Provide convex, cast, wall stops unless turn piece or push button on lockset handle makes contact with stop. Where contact is made provide concave wall stop.
2. Where wall stops cannot be used, provide universal dome type floor stops of the proper height.
3. Furnish fastener suitable for wall condition.
4. Acceptable manufacturers and types:

| | | | |
|--------------|--------|-------|----------|
| Type | Trimco | Burns | Hiawatha |
| Wall-Convex | 1270CX | 560 | 9212T |
| Wall-Concave | 1270CV | 565 | 9213T |
| Floor | 1211 | 521 | 9320 |

M. Silencers:

1. Brown rubber silencers with injector tool.
2. Three silencers at single doors and two silencers at pairs without door seal.
3. Acceptable manufacturers and types:

| Type | Trimco | Burns | Hiawatha |
|-----------|--------|-------|----------|
| HM Frames | 1229A | 500 | 601 |
| WD Frames | 1229B | 501 | 603 |

2.03 FINISHES

- A. Conform to ANSI/BHMA A156.18.
- | | | |
|----------------------|------------|------------------------|
| 1. Exterior Hinges | 630 | Satin Stainless Steel |
| 2. Interior Hinges | 626 or 652 | Satin Chrome |
| 3. Locks and Latches | 626 | Satin Chrome |
| 4. Exit Devices | 626 | Satin Chrome |
| 5. Door Closers | 689 | Spray Painted Aluminum |
| 6. Push/Pulls | 630 | Satin Stainless Steel |
| 7. Protection Plates | 630 | Satin Stainless Steel |
| 8. Stops and Holders | 630 | Satin Stainless Steel |

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify doors and frames are plumb, square, level and true and free from defects that would prevent proper installation of finish hardware.
- B. Wash down masonry walls and complete painting and staining of doors and frames prior to installation of hardware.
- C. Complete finish flooring at doorways.
- D. Correct conditions that inhibit a proper installation before continuing with work.

3.02 INSTALLATION

- A. Install hardware in compliance with the DHI publication, Installation Guide for Doors and Hardware.
- B. Drill and countersink items not factory prepared for fasteners.
- C. Mount closers on room-side of corridor doors, inside of exterior doors, and stair-side of stairway doors. Use necessary arms, brackets, spacers and plates to accommodate auxiliary hardware and special applications.
- D. Install fire door assemblies to maintain clearances at door edge to frame and meeting edge of pairs of doors in compliance with NFPA 80, providing 1/8-inch clearance at the hinge edge, lock edge, head and between pairs. Provide maximum 3/4-inch undercut at door bottom. Where panic thresholds are used, undercut door to allow 1/8-inch clearance between door and threshold.
- E. Trim, cut, and notch thresholds and saddles neatly to minimally fit the profile of the door frame. Set thresholds in bed of mastic sealant, forming tight seal between threshold and surface to which set.
- F. Use only fasteners furnished by manufacturer for installation as recommended by manufacturer.
- G. Install blocking material for all wall mounted door stops at height appropriate to contact door trim.
- H. Install weather-strip prior to installation of door closers and exit devices. Do not cut or notch weather-strip.

3.03 FIELD QUALITY CONTROL

- A. Verify doors open and close smoothly without rubbing or catching and have positive latching where scheduled. Verify fire rated doors are installed with clearances in compliance with NFPA 80.

3.04 ADJUSTING AND CLEANING

- A. Upon substantial completion, make final adjustments to door closers and other items of hardware after balance of heating and ventilating equipment to ensure doors close and latch properly.
- B. Clean and polish all exposed hardware surfaces in accordance with manufacturer's recommended procedures.
- C. Clean or repair pencil or tool marks from adjacent surfaces damaged or soiled by work of this Section.
- D. Recycle cardboard boxes and paper products used in packaging and transport of finish hardware.

3.05 PROTECTION

- A. Remove hardware prior to painting or finishing door and frame. Wrap or mask exposed hardware that cannot be removed until date of substantial completion to avoid exposure to paint, solvents, and abuse.
- B. Repair or replace hardware damaged during construction at least two weeks prior to date of substantial completion.

3.06 SCHEDULES

- A. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
- B. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

SET #01 - Exterior Fiberglass Entry

Doors: 110.1, 112.1

| | | | |
|--------------------------|---|-----|----|
| 3 Hinges | Provided by Therma-Tru as Pre-Hung Unit | 626 | |
| 1 Exit Device | QED111 x QET160 E BF | 626 | SH |
| 1 Door Closer w/Stop | QDC213 BF F | 689 | SH |
| 1 Weatherstrip/Threshold | Provided by Therma-Tru as Pre-Hung Unit | | |

NOTE: ADA compliant bumper threshold to be provided by FRP door manufacturer for outswing exterior doors.

SET #02 - Louvered Bi-fold Doors

Doors: 103.1, 106A.1

| | | | |
|-----------------------|---------|-----|----|
| 1 Pull | 562-4 | 630 | TR |
| 1 Bifold Hardware Set | BFC125N | | ST |

SET #03 - Bathroom

Doors: 104.1

| | | | |
|-----------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Privacy Set | QCL240 E 118F | 626 | SH |
| 1 Concave Wall Bumper | 1270WV | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #04 - Computer Lab/Multi-Purpose

Doors: 105.1, 111.1, 114.1, 121.1

| | | | |
|-----------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Classroom Lockset | QCL261 E 118F | 626 | SH |
| 1 Concave Wall Bumper | 1270WV | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #05 - Office

Doors: 107.1, 109.1

| | | | |
|------------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Entry/Office Lockset | QCL251 E 118F | 626 | SH |
| 1 Concave Wall Bumper | 1270WV | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #06 - Closet/Pantry

Doors: 113.1, 117.1, 119.1

| | | | |
|---------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Storeroom Lockset | QCL271 E 118F | 626 | SH |
| 1 Overhead Stop | 4420 Series | 32D | AB |
| 3 Door Silencers | 1229B | BRN | TR |

SET #07 - Multi-Purpose B - Existing Frame

Doors: 115.1, 115.2

| | | | |
|-----------------------|--------------------|-----|----|
| 3 Hinges | F179 3 1/2 X 3 1/2 | 26D | ST |
| 1 Classroom Lockset | QCL261 E 118F | 626 | SH |
| 1 Concave Wall Bumper | 1270WV | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

NOTE: New door and hardware in existing wood frame. Verify existing hinge size and location and strike size and location. Patch and repair frame to like new conditions and install new door and hardware.

SET #08 - Closet

Doors: 121.2

| | | | |
|----------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Storeroom Lockset | QCL271 E 118F | 626 | SH |
| 1 Convex Wall Bumper | 1270WX | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #09 - Food Pantry

Doors: 122.1

| | | | |
|---------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Storeroom Lockset | QCL271 E 118F | 626 | SH |
| 1 Floor Stop | 1211 | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #10 - Kitchen

Doors: 120.1

| | | | |
|--------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Pull Plate | 1017-3B | 630 | TR |

| | | | | |
|---|--------------------|----------------------------|-----|----|
| 1 | Push Plate | 1001-9 | 630 | TR |
| 1 | Door Closer w/Stop | QDC313 BF F | 689 | SH |
| 1 | Kick Plate | K0050 10" x 1" LDW B4E CSK | 630 | TR |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CSK | 630 | TR |
| 3 | Door Silencers | 1229B | BRN | TR |

SET #11 - Alternate

Doors: 101.1, 102.1

| | | | | |
|---|----------------------|---------------|-----|----|
| 1 | Entry/Office Lockset | QCL251 E 118F | 626 | SH |
|---|----------------------|---------------|-----|----|

NOTE: Remainder of Hardware is existing to remain. If alternate is accepted provide new lever entry lockset. Verify new lockset to fit in existing door/frame preparations. Patch and repair door and frame to like new conditions and install new lockset.

SET #12 - Alternate

Doors: 118.1, 122.2

| | | | | |
|---|-------------------|---------------|-----|----|
| 1 | Storeroom Lockset | QCL271 E 118F | 626 | SH |
|---|-------------------|---------------|-----|----|

NOTE: Remainder of Hardware is existing to remain. If alternate is accepted provide new lever storeroom lockset. Verify new lockset to fit in existing door/frame preparations. Patch and repair door and frame to like new conditions and install new lockset.

SET #13 - Existing

Doors: 123.1, 123.2, 124.1, 125.1, 126.1, 127.1, 128.1

NOTE: Door, Frame and Hardware are existing to remain.

SET #14 – Hallway Passage

Door: 116.1

| | | | | |
|---|--------------------|---|-----|----|
| 3 | Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 | Passage Set | QCL230 E 118F | 626 | SH |
| 1 | Door Closer w/Hold | QDC212 BF F | 689 | SH |
| 1 | Kick Plate | K0050 10" x 2" LDW B4E CSK | 630 | TR |
| 1 | Wall Stop | 1270WV | 626 | TR |
| 3 | Door Silencers | 1229B | BRN | TR |

END OF SECTION

SECTION 08712 - DOOR HARDWARE**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
 - 1. Hardware for swinging Fiberglass and Wood Door Openings.
 - 2. Field modification and preparation of existing doors and frames for new hardware being installed. **Provide fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preparations.**
- B. Work Furnished But Installed Under Other Sections:
 - 1. Furnish templates to Sections 08211 - Flush Wood Doors for door and frame preparation.
- C. Related Sections:
 - 1. Section 06100 – Rough Carpentry
 - 2. Section 06200 – Finish Carpentry
 - 3. Section 08200 – Flush Wood Doors
 - 4. Section 08113 – Fiberglass Doors

1.02 REFERENCES

- A. Use the following references to properly detail, schedule, furnish and install finish hardware items.
 - 1. NFPA 80 – Standard for Fire Doors and Other Opening Protectives (2007)
 - 2. DHI Installation Guide for Doors and Hardware (1984)
 - 3. DHI Sequence and Format for the Hardware Schedule (1996)
 - 4. ANSI A117.1 Accessible and Usable Buildings and Facilities (2003)
 - 5. ANSI/BHMA A156.4 – Door Controls – Closers (2013)
 - 6. ANSI/BHMA A156.2 – Bored and Preassembled Locks and Latches (2011)
 - 7. ANSI/BHMA A156.18 – Materials and Finishes (2012)

1.03 SUBMITTALS

- A. Schedule:
 - 1. Provide submittals in accordance with 01 33 00 – Submittal Procedures.
 - 2. Provide hardware schedule in vertical format on 8-1/2-inch by 11-inch paper for electronic format. Conform to DHI publication Sequence and Format for Hardware Schedule using Architect's door numbers and hardware set numbers.
 - 3. Provide elevation drawings for openings with electrical hardware and access control devices with each hardware schedule. Include illustration of opening, operational description, electrified hardware components, legend, approximate mounting location and size of enclosures, size and quantity of conductors, facility name and date.
- B. Product Data: Provide one set of manufacturer's catalog and technical data for each hardware item used, highlighting design, function, fasteners, accessories, and options to facilitate review with each hardware schedule submitted.
- C. Templates: Provide two sets of manufacturer's templating information for mortised and template hardware upon receipt of approved hardware schedule to the door and frame supplier(s). Include requirements for internal reinforcements required for surface mounted hardware.
- D. Keying Schedule: Arrange meeting with Owner, Architect and finish hardware supplier to determine keying requirements immediately upon receipt of finish hardware schedule.

1.04 CLOSEOUT SUBMITTALS

- A. Furnish operations and maintenance manual in accordance with Section 01 78 28 – Operations and Maintenance Data and as follows:
 - 1. Furnish one copy of manual at date of Substantial Completion in a 2-1/2-inch thick binder labeled with project information, date and name and contact information for the hardware supplier.
 - 2. Include in manual:

- a. Copy of approved hardware schedule, including door numbers and locations. Highlight fire rated door to aid in annual fire door inspection.
- b. Copy of approved keying schedule.
- c. Catalog data for each product.
- d. Parts list for locksets, exit devices, and door closers.
- e. Installation templates and instructions.
- f. Warranty information.
- g. Name, address, and phone number of local representatives for each manufacturer.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Materials:

1. Screws and Fasteners: Fifty of each screw and fastener required for general maintenance of hinges, locks, closers, exit devices, and sealing systems.
2. Deliver to Owner remaining finish hardware fasteners and special installation tools upon completion of Project.

1.06 QUALITY ASSURANCE

A. Supplier:

1. Furnish hardware from recognized supplier who has warehousing facility within 100 miles of project location, and who has actively supplied hardware for similar projects in the vicinity for a minimum of five years.
2. Supplier shall employ an Architectural Hardware Consultant (AHC), as certified by Door and Hardware Institute, on staff full time to administer and supervise project.

B. Installer: Install hardware using installers who have actively installed commercial door hardware for a minimum of five years, and are familiar with hardware installation of type required on this Project.

C. Pre-Installation Meeting:

1. Prior to installation of hardware, arrange for manufacturer's representatives of locksets, door closers, and exit devices to hold a jobsite meeting to instruct the installing personnel on the proper installation of their products.
2. Send a letter of compliance, indicating when this meeting was held, and who was in attendance, to the Architect and Owner.

D. Fire Rated Door Openings:

1. Comply with NFPA 80.
2. Furnish nationally recognized testing agency label or stamp on hardware for labeled openings.
3. Only labeled locks or latches or fire exit hardware can be used on fire rated openings.
4. Where UL requirements conflict with Drawings or Specifications, furnish hardware conforming to the UL requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Jointly check in hardware, upon delivery to jobsite, against approved hardware schedule with hardware supplier. Record shortage or damage and replace or repair as necessary.
2. Deliver hardware to be installed during fabrication of doors and frames, to manufacturer.

B. Storage:

1. Store hardware in a secure, dry, temperature controlled room on shelving to protect against loss, theft and damage.
2. Store items too long for shelving on pallet, off the floor.

C. Marking and Packaging:

1. Deliver hardware to jobsite in manufacturer's original packaging marked to correspond with approved hardware schedule with Architect's door numbers and hardware sets.

2. Mark all locksets, exit devices, cylinders, auxiliary hardware and key switches with keyset symbol.
3. Replace any wet or damaged packaging with new.

1.08 WARRANTY

- A. Furnish warranties in accordance with Section 01 78 36 – Warranties. Extended or limited warranties shall be as follows:
 1. Furnish minimum ten year factory warranty on door closers, against defects in material and workmanship, from date of substantial completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. The following manufacturers' are acceptable for use on this project. Provide like items of hardware from one of the manufacturers listed.

| | |
|-----------------------------|---|
| 1. Hinges | Stanley, Hager, McKinney |
| 2. Locks and Latchsets | Stanley Commercial, Schlage, Corbin Russwin |
| 3. Cylinders and Cores | Stanley Commercial – Best Keyway |
| 4. Surface Door Closers | Stanley Commercial, LCN, Corbin Russwin |
| 5. Exit Devices | Stanley Commercial, Von Duprin, Sargent |
| 6. Overhead Stop/holders | ABH, Glynn Johnson, Rixson |
| 7. Protection Plates | Trimco, Burns, Hiawatha |
| 8. Wall/Floor Stops | Trimco, Burns, Hiawatha |
| 9. Thresholds and Gasketing | National Guard, Reese, Pemko |
| 10. Silencers | Trimco, Burns, Hiawatha |
- B. Submit requests for substitution in accordance with Section 01 25 13 Product Substitution Procedures as follows:
 1. Provide catalog data with product information highlighted or bubbled to facilitate review. Product must meet or exceed quality level or design intended and/or function established by specified products.

2.02 MATERIALS

- A. Screws and Fasteners:
 1. Provide manufacturer's recommended fasteners of proper type, material and finish.
 2. Provide self-tapping screws for sweeps and stop applied weatherstripping.
 3. Utilize through-bolts for the attachment of door closers and exit devices on non-reinforced doors only. Finish: match door face.
 4. Exposed screw heads: phillips-head type.
- C. Hinges:
 1. Type:
 - a. Five-knuckle, full mortise, plain bearing.
 - b. Furnish heavy weight hinges on heavy doors and doors expected to have high frequency use.
 2. Quantity:
 - a. One pair of hinges for all doors up to 5 feet high. Furnish one additional hinge for every 2'-6" in height or fraction thereof.
 3. Size:
 - a. For 1-3/8-inch thick doors up to 3 feet wide 3-1/2-inches high
 - b. For 1-3/4-inch thick doors up to 3 feet wide: 4 1/2-inches high
 - c. For 1-3/4-inch thick doors over 3 feet wide: 5-inches high
 - d. For all doors over 1-3/4-inches thick: 5-inches high
 - e. Size in width shall minimally clear door trim.
 4. Application:
 - a. NRP (non-removable pin) at exterior doors and reverse bevel doors with locking hardware.
 5. Acceptable manufacturers and types:

| | | | |
|-----------------|---------|-------|----------|
| Type | Stanley | Hager | McKinney |
| Standard Weight | F179 | 1279 | T2714 |

D. Locksets:

1. Cylindrical Locks:

- a. Conform to ANSI/BHMA A156.2, Series 4000 Operational Grade 1.
- b. Latchbolt with appropriate throw for fire rated doors and pairs of doors in accordance with manufacturers listing.
- c. Lock functions as specified in hardware schedule.
- d. Lever design: Sierra €
- e. Backset: 2-3/4-inch
- f. Strike single door: ANSI 4-7/8-inch with proper lip length to minimally clear trim.
- g. Strike pair of doors: flat lip strike sized to fit flush with face of door.
- h. Furnish wrought strike box.
- i. Acceptable manufacturers and types:

| | | |
|--------------------|-----------|----------------|
| Stanley Commercial | Schlage | Corbin Russwin |
| QCL200 Series | AL Series | CL3800 Series |

2. Cylinders:

- a. Provide mortise and rim cylinders and cores from same manufacturer as locksets for all locksets, exit devices, cylinder dogging, key switches and auxiliary hardware.
- b. Appropriate cam and blocking rings for proper installation.

E. Keys & Keying

- 1. Cylinders: 6-pin, interchangeable core and keyed into a BEST factory registered Masterkey System.
- 2. Provide construction cores and keys during construction period. Construction control and operating keys and cores are not part of permanent keying system or furnished on same keyway (or key section) as permanent keying system.
- 3. Permanent Keys and Cores: Prepare permanent cores and keys in accordance with keying schedule. Provide Masterkeys and other Security Keys.
- 4. Furnish keys in the following quantities:
 - a. 4 each Masterkeys per new Masterkey set.
 - b. 2 each Change keys each keyed core.
 - c. 6 each Construction masterkeys.
 - d. 2 each Construction Control keys.
 - e. 2 each Control keys.
- 5. Install permanent cores in locksets.
- 6. Return construction cores to Hardware Supplier.

F. Exit Devices:

- 1. UL-listed for fire at fire door assemblies, and UL listed for panic at non-rated door assemblies.
- 2. Size exit devices to proper door width and height.
- 3. LBR (less bottom rod) where scheduled to eliminate use of floor mounted strikes.
- 4. Cylinders for exit devices with cylinder dogging or locking trim.
- 5. Strike: as recommended by manufacturer.
- 6. Lever design: To match lockset trim.
- 7. Acceptable manufacturers and types:

| | | |
|--------------------|------------|-----------|
| Stanley Commercial | Von Duprin | Sargent |
| QED100 Series | 98 Series | 80 Series |

G. Exterior Surface Door Closers:

- 1. Conform to ANSI/BHMA A156.4 Grade 1.
- 2. Heavy duty cast aluminum door closers
- 3. Furnish manufacturers recommended size, arms and configuration for door and frame application required.
- 4. Furnish brackets, spacers, support shoes, and plates for complete and proper installation.
- 5. DA (delayed-action) at toilet room doors and as scheduled.

6. Acceptable manufacturers and types:

| | | |
|---------------|-------------|----------------|
| Stanley | LCN | Corbin Russwin |
| QDC200 Series | 1460 Series | DC3000 Series |

H. Interior Surface Door Closers:

7. Conform to ANSI/BHMA A156.4 Grade 1.
8. Standard duty cast aluminum door closers
9. Furnish manufacturers recommended size, arms and configuration for door and frame application required.
10. Furnish brackets, spacers, support shoes, and plates for complete and proper installation.
11. DA (delayed-action) at toilet room doors and as scheduled.

12. Acceptable manufacturers and types:

| | | |
|---------------|-------------|----------------|
| Stanley | LCN | Corbin Russwin |
| QDC300 Series | 1070 Series | DC4600 Series |

I. Overhead Door Stop:

1. Provide overhead stop or overhead stop/holder for interior doors as specified. Provide overhead stop for interior doors and at any door that swings more than 120 degrees before striking a wall, open against equipment, casework, sidelights, and/or where conditions do not allow a wall stop or a floor stop presents a tripping hazard.
2. Where overhead holders are specified provide friction type at doors without a closer and positive type at doors with a closer.
3. Acceptable manufacturers:

| | | |
|-------------|-----------|---------------|
| ABH | Rixson | Glynn Johnson |
| 4420 Series | 10 Series | 450 Series |

J. Door Trim:

1. Provide push plates 6 inches wide x 16 inches high x 0.050 inch thick and beveled 4 edges. Where width of door stile prevents use of 6 inches wide plate, adjust width to fit.
2. Provide pull plates 4 inches wide x 16 inches high x 0.050 inch thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches wide plate, adjust width to fit.
3. Acceptable manufacturers:

| | | | |
|------------|---------|-------|-----------|
| Type | Trimco | Burns | Hiawatha |
| Push | 1001-9 | 56 | 200H |
| Pull Plate | 1017-3B | 5425B | 200Fx523A |

K. Protection Plates:

1. Where bottom rail allows, furnish 10-inch high kick plates and 10-inch high mop plates.
2. Material: 0.050-inch thick stainless steel plates with four beveled edges.
3. Width: 2-inch less door width on stop (push) side and 1-inch less door width on face (pull) side.
4. Both sides of doors where specified.
5. Countersink screw heads at wood doors.
6. Acceptable manufacturer and types:

| | | |
|--------|-------|----------|
| Trimco | Burns | Hiawatha |
| K0050 | KP50 | KP |

L. Door Stops:

1. Provide convex, cast, wall stops unless turn piece or push button on lockset handle makes contact with stop. Where contact is made provide concave wall stop.
2. Where wall stops cannot be used, provide universal dome type floor stops of the proper height.
3. Furnish fastener suitable for wall condition.
4. Acceptable manufacturers and types:

| | | | |
|--------------|--------|-------|----------|
| Type | Trimco | Burns | Hiawatha |
| Wall-Convex | 1270CX | 560 | 9212T |
| Wall-Concave | 1270CV | 565 | 9213T |
| Floor | 1211 | 521 | 9320 |

M. Silencers:

1. Brown rubber silencers with injector tool.
2. Three silencers at single doors and two silencers at pairs without door seal.
3. Acceptable manufacturers and types:

| Type | Trimco | Burns | Hiawatha |
|-----------|--------|-------|----------|
| HM Frames | 1229A | 500 | 601 |
| WD Frames | 1229B | 501 | 603 |

2.03 FINISHES

- A. Conform to ANSI/BHMA A156.18.
- | | | |
|----------------------|------------|------------------------|
| 1. Exterior Hinges | 630 | Satin Stainless Steel |
| 2. Interior Hinges | 626 or 652 | Satin Chrome |
| 3. Locks and Latches | 626 | Satin Chrome |
| 4. Exit Devices | 626 | Satin Chrome |
| 5. Door Closers | 689 | Spray Painted Aluminum |
| 6. Push/Pulls | 630 | Satin Stainless Steel |
| 7. Protection Plates | 630 | Satin Stainless Steel |
| 8. Stops and Holders | 630 | Satin Stainless Steel |

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify doors and frames are plumb, square, level and true and free from defects that would prevent proper installation of finish hardware.
- B. Wash down masonry walls and complete painting and staining of doors and frames prior to installation of hardware.
- C. Complete finish flooring at doorways.
- D. Correct conditions that inhibit a proper installation before continuing with work.

3.02 INSTALLATION

- A. Install hardware in compliance with the DHI publication, Installation Guide for Doors and Hardware.
- B. Drill and countersink items not factory prepared for fasteners.
- C. Mount closers on room-side of corridor doors, inside of exterior doors, and stair-side of stairway doors. Use necessary arms, brackets, spacers and plates to accommodate auxiliary hardware and special applications.
- D. Install fire door assemblies to maintain clearances at door edge to frame and meeting edge of pairs of doors in compliance with NFPA 80, providing 1/8-inch clearance at the hinge edge, lock edge, head and between pairs. Provide maximum 3/4-inch undercut at door bottom. Where panic thresholds are used, undercut door to allow 1/8-inch clearance between door and threshold.
- E. Trim, cut, and notch thresholds and saddles neatly to minimally fit the profile of the door frame. Set thresholds in bed of mastic sealant, forming tight seal between threshold and surface to which set.
- F. Use only fasteners furnished by manufacturer for installation as recommended by manufacturer.
- G. Install blocking material for all wall mounted door stops at height appropriate to contact door trim.
- H. Install weather-strip prior to installation of door closers and exit devices. Do not cut or notch weather-strip.

3.03 FIELD QUALITY CONTROL

- A. Verify doors open and close smoothly without rubbing or catching and have positive latching where scheduled. Verify fire rated doors are installed with clearances in compliance with NFPA 80.

3.04 ADJUSTING AND CLEANING

- A. Upon substantial completion, make final adjustments to door closers and other items of hardware after balance of heating and ventilating equipment to ensure doors close and latch properly.
- B. Clean and polish all exposed hardware surfaces in accordance with manufacturer's recommended procedures.
- C. Clean or repair pencil or tool marks from adjacent surfaces damaged or soiled by work of this Section.
- D. Recycle cardboard boxes and paper products used in packaging and transport of finish hardware.

3.05 PROTECTION

- A. Remove hardware prior to painting or finishing door and frame. Wrap or mask exposed hardware that cannot be removed until date of substantial completion to avoid exposure to paint, solvents, and abuse.
- B. Repair or replace hardware damaged during construction at least two weeks prior to date of substantial completion.

3.06 SCHEDULES

- A. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
- B. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

SET #01 - Exterior Fiberglass Entry

Doors: 110.1, 112.1

| | | | |
|--------------------------|---|-----|----|
| 3 Hinges | Provided by Therma-Tru as Pre-Hung Unit | 626 | |
| 1 Exit Device | QED111 x QET160 E BF | 626 | SH |
| 1 Door Closer w/Stop | QDC213 BF F | 689 | SH |
| 1 Weatherstrip/Threshold | Provided by Therma-Tru as Pre-Hung Unit | | |

NOTE: ADA compliant bumper threshold to be provided by FRP door manufacturer for outswing exterior doors.

SET #02 - Louvered Bi-fold Doors

Doors: 103.1, 106A.1

| | | | |
|-----------------------|---------|-----|----|
| 1 Pull | 562-4 | 630 | TR |
| 1 Bifold Hardware Set | BFC125N | | ST |

SET #03 - Bathroom

Doors: 104.1

| | | | |
|-----------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Privacy Set | QCL240 E 118F | 626 | SH |
| 1 Concave Wall Bumper | 1270WV | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #04 - Computer Lab/Multi-Purpose

Doors: 105.1, 111.1, 114.1, 121.1

| | | | |
|-----------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Classroom Lockset | QCL261 E 118F | 626 | SH |
| 1 Concave Wall Bumper | 1270WV | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #05 - Office

Doors: 107.1, 109.1

| | | | |
|------------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Entry/Office Lockset | QCL251 E 118F | 626 | SH |
| 1 Concave Wall Bumper | 1270WV | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #06 - Closet/Pantry

Doors: 113.1, 117.1, 119.1

| | | | |
|---------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Storeroom Lockset | QCL271 E 118F | 626 | SH |
| 1 Overhead Stop | 4420 Series | 32D | AB |
| 3 Door Silencers | 1229B | BRN | TR |

SET #07 - Multi-Purpose B - Existing Frame

Doors: 115.1, 115.2

| | | | |
|-----------------------|--------------------|-----|----|
| 3 Hinges | F179 3 1/2 X 3 1/2 | 26D | ST |
| 1 Classroom Lockset | QCL261 E 118F | 626 | SH |
| 1 Concave Wall Bumper | 1270WV | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

NOTE: New door and hardware in existing wood frame. Verify existing hinge size and location and strike size and location. Patch and repair frame to like new conditions and install new door and hardware.

SET #08 - Closet

Doors: 121.2

| | | | |
|----------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Storeroom Lockset | QCL271 E 118F | 626 | SH |
| 1 Convex Wall Bumper | 1270WX | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #09 - Food Pantry

Doors: 122.1

| | | | |
|---------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Storeroom Lockset | QCL271 E 118F | 626 | SH |
| 1 Floor Stop | 1211 | 626 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #10 - Kitchen

Doors: 120.1

| | | | |
|--------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Pull Plate | 1017-3B | 630 | TR |

| | | | |
|----------------------|----------------------------|-----|----|
| 1 Push Plate | 1001-9 | 630 | TR |
| 1 Door Closer w/Stop | QDC313 BF F | 689 | SH |
| 1 Kick Plate | K0050 10" x 1" LDW B4E CSK | 630 | TR |
| 1 Kick Plate | K0050 10" x 2" LDW B4E CSK | 630 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

SET #11 - Alternate

Doors: 101.1, 102.1

| | | | |
|------------------------|---------------|-----|----|
| 1 Entry/Office Lockset | QCL251 E 118F | 626 | SH |
|------------------------|---------------|-----|----|

NOTE: Remainder of Hardware is existing to remain. If alternate is accepted provide new lever entry lockset. Verify new lockset to fit in existing door/frame preparations. Patch and repair door and frame to like new conditions and install new lockset.

SET #12 - Alternate

Doors: 118.1, 122.2

| | | | |
|---------------------|---------------|-----|----|
| 1 Storeroom Lockset | QCL271 E 118F | 626 | SH |
|---------------------|---------------|-----|----|

NOTE: Remainder of Hardware is existing to remain. If alternate is accepted provide new lever storeroom lockset. Verify new lockset to fit in existing door/frame preparations. Patch and repair door and frame to like new conditions and install new lockset.

SET #13 - Existing

Doors: 123.1, 123.2, 124.1, 125.1, 126.1, 127.1, 128.1

NOTE: Door, Frame and Hardware are existing to remain.

SET #14 – Hallway Passage

Door: 116.1

| | | | |
|----------------------|---|-----|----|
| 3 Hinges | Provided by Pre-Hung Wood Door/Frame Mfg. | | |
| 1 Latchset | | | |
| 1 Door Closer w/Stop | QDC313 BF F | 689 | SH |
| 1 Kick Plate | K0050 10" x 1" LDW B4E CSK | 630 | TR |
| 1 Kick Plate | K0050 10" x 2" LDW B4E CSK | 630 | TR |
| 3 Door Silencers | 1229B | BRN | TR |

END OF SECTION

SECTION 08800 - GLASS AND GLAZING**PART 1 - GENERAL**1.01 **DESCRIPTION OF WORK:**

- A. Furnishing all materials, labor and equipment to provide and install glass and glazing as shown on the Drawings, Schedules and specified herein.
 - 1. Definitions: "Glass" includes both primary and fabricated glass products as described in FMGA "Glazing Manual" and, for this project, extends to glass and opaque infill panels to be glazed into window frames. "Glazing" includes glass and other materials being installed to in-fill a window frame.
- B. Types of work in this section include glass and glazing for:
 - 1. Entrances and other doors not indicated as preglazed.
 - 2. Other windows not indicated as pre-glazed.
- C. This section provides requirements for glass and glazing for factory preglazed doors and windows.
- D. This section includes specifications for insulating glass and opaque infill panels.

1.02 **RELATED DOCUMENTS:**

- A. All Drawings and general provisions of Contract, including General Conditions, Supplementary Conditions, Division 0, and Division 1 Specification sections apply to the Work of this Section.
- B. Coordinate with Drawings and Schedule for laminated and tempered glass lites required beyond those as required by code.**

1.03 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 09900 - Painting

1.04 **SYSTEM PERFORMANCE:**

- A. Provide glass and glazing that has been produced, fabricated and installed to withstand normal temperature changes, wind loading, impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in the work.
- B. Glass Design: thickness designations are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
 - 1. Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
 - a. Specified Design Wind Loads: not less than wind loads applicable to Project as required by ASCE 7 "Minimum Design Loads for Building and Other Structures": Section 6.0 'wind loads'.
 - b. Maximum Lateral Deflection: for the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.
 - 1) For monolithic-glass lites heat treated to resist wind loads.
 - 2) For insulating glass.
 - 3) For laminated-glass lites.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change in ambient and surface temperatures acting on glass framing members and glazing components.

1.05 **REFERENCE STANDARDS:**

- A. Products and materials shall comply with the following standards:
 - 1. FS DD-G-1403B - Glass, Plate, Sheet, Figured and Spandrel (Heat Strengthened and Fully Tempered).

2. FS DD-M-411 - Mirror Glass.
3. SIGMA No. 65-7-2 - Specification for Sealed Insulating Glass Units.
4. ANSI Z97.1 - for Safety Glazing Material.
5. ASTM E-546 - Test for Frost Point of Sealed Insulating Glass Units.
6. ASTM D-576 - Test for Dew/Frost Point of Sealed Insulating Glass Units.
7. UL Building Materials Directory Classification (KCMZ) for Glazing of Fire Rated Doors and Windows.

1.06 QUALITY ASSURANCE:

- A. Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FMGA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.
- B. Safety Glazing Standard: Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.
- C. All materials and glazing shall comply with Federal, State and Local Regulations, Codes, and Ordinances; the more stringent requirements shall govern.
- D. Fire-Resistance-Rated Wire Glass: Where indicated and allowed by Code, provide wire glass products that are identical to those tested per ASTM E 163 (UL 9) are and listed by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Insulating Glass Certification Program: Subject to compliance with requirements, provide insulating glazing units permanently marked either on spacers or on at least one component pane of units with appropriate certification label of inspecting and testing organization indicated below.
 1. Insulating Glass Certification Council (IGCC).
 2. Associated Laboratories, Inc. (ALI).
- G. Single Source Responsibility: Provide materials obtained from one source for each type of glass and glazing product indicated.

1.07 SUBMITTALS:

- A. General: Submit per Section 01300 – Submittals.
- B. Product Data: Submit manufacturer's technical data for each glazing material and fabricated glass product required, including installation and maintenance instructions.
- C. Samples: Submit, for verification purposes, two 12" square samples of each type of glass and panel product indicated except for clear single pane units, and 12" long samples of each color required (except black) for each type of sealant or gasket exposed to view.
- D. Certification: Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.
 1. Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.
- E. Test Reports: Submit sealant-substrate adhesion and sealant compatibility test reports, including glazing sealant manufacturer's findings and recommendations.

1.08 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Deliver glass materials in perfect condition. Glazing compounds and sealants shall be in manufacturer's unopened, labeled containers.
- B. All glass materials and glass products shall be stored in the dry, under cover, and on wood blocking. Store and handle materials to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

1.09 PROJECT CONDITIONS:

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes. Install glazing sealants only when temperatures are in middle third of manufacturer's recommended installation temperature range.

1.10 WARRANTY:

- A. Insulating Glass Units: Glass shall be warranted from visual obstruction due to internal moisture for a period of ten (10) years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS, GENERAL:

- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.

2.02 GLASS PRODUCTS, GENERAL:

- A. All primary glass, fabricated glass products and opaque infill panels shall be new, up to grade requirements and free of bubbles and other imperfections. Each piece of glass shall bear the manufacturer's label, indicating quality and grade. Labels shall remain intact until final acceptance and cleaning, unless otherwise recommended by manufacturer. All glass must comply with all regulating codes.
- B. Sizes: Fabricate glass, fabricated glass products and opaque infill panels to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Perform field measurements to determine sizes for existing openings. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

2.03 PRIMARY GLASS MATERIALS:

A. GENERAL GLASS MATERIAL:

1. Typical Float Glass (transparent flat glass): Shall be clear, 1/4" thick; and shall meet or exceed ASTM C1036, Quality-Q3.
2. Acceptable Manufacturers: Subject to compliance with requirements, provide products from one of the following manufacturers for each type of glass required by the Project.
 - a. PPG Industries Inc.
 - b. LOF, Libbey-Owens-Ford Co.
 - c. Guardian Industries Corp.
 - d. Viracon

B. **SAFETY GLASS MATERIALS:**

1. **Safety Glazing Standard** - Where safety glass is indicated or required by authorities having jurisdiction, provide type of products indicated which comply with material testing requirements of 16 CFR Part 1201 for Category I or II – as required, and ANSI Z97.1. Category I shall be allowed for glazing of less than 9 SF (1,296 SI) per lite - as allowed by CPSC 16 CFR 1201 chart. All other Safety Glazing shall meet Category II. **Wired glass will only be allowed if specifically noted in the Schedule or elsewhere in these Documents.**
2. Tempered Glass: Clear, 1/4" tempered; shall meet or exceed ASTM C1048. Acceptable Manufacturers: Subject to compliance with requirements, provide products from one of the following for each type:
 - 1) Guardian Industries Corp.
 - 2) Temp Glass, 1-800-537-4064
 - 3) Viracon

3. Laminated Glass: Heat-Strengthened clear glass on either side of either a clear or a milky (translucent) white PVB interlayer of 0.060" thickness. Total glass thickness to be ¼" for typical applications.
 - b. Laminated Glass shall meet the current requirements of the ASTM E-1172 "Standard Specification for Laminated Architectural Float Glass."
 - c. For safety glazing applications, Laminated Glass shall comply with the Consumer Product Safety Commission 16 CFR 1201 for Category I or II – as required, and the Safety Glass requirements of ANSI Z-97.1 (current editions).
 - d. Acceptable Manufacturers: Subject to compliance with requirements, provide products from one of the following for each type:
 - 1) Guardian Industries Corp.
 - 2) Temp Glass, 1-800-537-4064
 - 3) Viracon

C. FIRE-RATED GLAZING:

1. All fire-rated glazing shall be tested in accordance with ASTM E 119 or UL 263, and labeled accordingly. Each glazing material shall meet the requirements set forth in NFPA for each application: NFPA 252 for opening protectives; NFPA 80 for fire doors and shutters; NFPA 252 and/or 257 for doors.
2. All Products shall comply with material testing requirements of 16 CFR Part 1201 for Category I or II – as required, and ANSI Z97.1, unless noted otherwise.
3. **20-MINUTE Fire-Rated Safety Glass:**
 - a. Acceptable Products and Manufacturers: Subject to compliance with requirements, provide products from one of the following type:
 - 1) Provide product equal to 1/4" PyroEdge-20, by AGC InterEdge Technologies.
 - 2) Or Architect approved substitution under provisions of Section 01600.

2.04 GLAZING SEALANTS:

- A. General: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants which have performance characteristics suitable for applications indicated and conditions at time of installation.
- B. Compatibility: Select sealants with proven compatibility with surfaces contacted in the installation and under service conditions indicated, as demonstrated by testing and field experience.
- C. Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.
- D. Acrylic Glazing Sealant: Acrylic terpolymer or polypropenate solvent-based thermoplastic 1-part sealant complying with FS TT-S-00230, Class B, Type II; and with ASTM C 920, Type S, Grade NS, Class 12 1/2, Use G and, as applicable to use indicated, Uses A and O.
- E. Preformed Butyl-Polyisobutylene Glazing Tape: Blend of butyl-polyisobutylene rubber with a solids content of 100%, in extruded tape form, complying with AAMA 807.1, packaged on rolls with a release paper on side, with or without continuous spacer rod as recommended by manufacturers of tapes and glass for application indicated.
- F. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following.
 1. Acrylic Glazing Sealants:
 - a. Tremco.
 5. Preformed Butyl-Polyisobutylene Glazing Tape:
 - a. Tremco.

2.05 MISCELLANEOUS GLAZING MATERIALS:

- A. Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.

- D. Spacers: Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.
- E. Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.
- F. Compressible Filler Rods: Closed-cell or waterproof jacketed rod stock of synthetic rubber or plastic foam, flexible and resilient, with 5-10 psi compression strength for 25% deflection.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Require Glazier to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION:

- A. Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings that are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.03 GLAZING, GENERAL:

- A. Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards. Glazing performed at temperatures below 40 degrees F. shall be done in accordance with manufacturer's recommendations.
- B. Glazing channel dimensions as indicated in details are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- C. Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge that would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by pre-construction sealant-substrate testing.

3.04 GLAZING:

- A. Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but no closer than 6", unless otherwise required. Set blocks in thin course of sealant that is acceptable for heel bead use.
- B. Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches, except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.
- D. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

- E. Provide compressible filler rods or equivalent back-up material, as recommended by sealant and glass manufacturers, to prevent sealant from extruding into glass channel weep systems and from adhering to joints back- surface as well as to control depth of sealant for optimum performance, unless otherwise indicated.
- F. Force sealants into glazing channels to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- G. Tool exposed surfaces of sealants to provide a substantial "wash" way from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.

3.05 PROTECTION AND CLEANING:

- A. Protect exterior glass from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.
- D. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including damage by natural causes, accident and vandalism.
- E. Wash glass on both faces not more than four days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.
- F. Replace any insulated glass that shows fogging in the first two years.

END OF SECTION - 08800

SECTION 09250 - GYPSUM DRYWALL SYSTEM**PART 1 - GENERAL**1.01 **DESCRIPTION OF WORK:**

- A.** Furnishing and installing all labor, materials and equipment necessary for a complete installation of each type of gypsum board assembly with accessories as shown on the Drawings and/or Finish Schedules, and specified herein.
- B. Work includes but is not limited to:**
1. Rated walls and/or ceilings at demising walls as indicated on Documents.
 2. Gypsum board partitions as backing for tile and other veneer finish applications.
 3. Framing for other types of interior/exterior sheathing.
 4. Gypsum Board assemblies for rated and non-rated ceiling, wall, and soffit conditions, including furring.
 5. Ceiling suspension and/or framing systems.
 6. Design, fabrication, and installation of light gage metal headers wherever a 'L.G. Header' is noted on the Drawings.
 7. Framing for other types of interior/exterior sheathing.
 8. Patching of gaps in gypsum board finishes and feathering-in drywall compounds where new work abuts existing and/or when drawings require partial demo of existing.
 9. 'Refinishing' existing unfinished gypsum board walls.
 10. Plaster skimcoating over existing plaster surfaces.
 11. Plaster patching as required.
 12. Blocking for wall-hung components by others, including but not limited to wall cabinets, scoreboards, and trim, and for the upper support of floor-mount components by others, including but not limited to full-height cabinets.

1.02 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 06100 – Rough Framing
- B. Section 07200 - Insulation.
- C. Section 07900 – Joint Sealers
- D. Section 09900 - Painting.

1.03 **QUALITY ASSURANCE:**

- A. Where work is indicated for fire resistance ratings, including those required to comply with governing regulations, provide materials and installations identical with applicable assemblies that have been tested and listed by recognized authorities, including UL.
- B. Comply with applicable requirements of GA 203 - Installation of Screw-Type Steel Framing Members to Receive Gypsum Board.
- C. Comply with applicable requirements of GA-216 "Application and Finishing of Gypsum Board" by the Gypsum Association, except where more stringent requirements are recommended by the manufacturer.
- D. Steel studs, runners and furring channels shall comply with the requirements of ASTM Specification C-645-08, C-channel, roll-formed from hot-dipped galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion resistant coating.
- E. Installation of steel framing members for gypsum wallboard shall comply with the requirements of ASTM Specification C-754.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanize) or zinc-iron alloy-coated (galvanized) by the Hot-Dip Process.
- G. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
- H. ASTM C754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.
- I. ASTM C847 - Standard Specification for Metal Lath.
- J. ASTM C1002- Standard Specification Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

- K. ASTM C1047 – Standard Specification for Accessories for Gypsum Wallboard and Gypsum veneer Base (Drywall and Veneer Trims).
- L. ASTM C1063- Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.
- M. ASTM C1396 - Standard Specification for Gypsum Board
- N. Apply acoustical sealant in accordance with requirements of ASTM C919.

1.04 SUBMITTALS:

- A. Product Data: Submit product data describing standard framing member materials and finish, product criteria, load charts, limitations, and other pertinent information as requested by architect.
- B. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and connections.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover, off the ground or in a manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging. Disperse stacks of gypsum board to prevent overloading of structural system.
- C. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.
- D. Damages or deteriorated materials shall be removed from the site and replaced with items of acceptable quality, without cost to the Owner.
- E. Steel framing and related accessories shall be stored and handled in accordance with the A.I.S.I. "Code of Standard Practice."

1.06 PROJECT CONDITIONS:

- A. Environmental Requirements, General: Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer for environmental conditions before, during, and after application of gypsum board.
- B. Cold Weather Protection: When ambient outdoor temperatures are below 55 degrees F., maintain continuous, uniform, comfortable building working temperatures of not less than 55 degrees F. for a minimum period of 48 hours prior to during, and following application of gypsum board and joint treatment materials or bonding of adhesives.
- C. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapids drying.

1.07 SYSTEM REQUIREMENTS:

- A. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- B. Provide gypsum board shaft-wall assemblies capable of withstanding the full air-pressure loads indicated for maximum heights of partitions without failing and while maintaining an airtight and smoke-tight seal.
- C. Refer to Section 3.06 for final appearance performance required of specific locations.
- D. General Performance Requirements:
 - 1. **Gypsum Board Partitions: Standard partitions – maximum deflection of 1/240 of partition height. Partitions to receive water resistant gypsum board or backer board – maximum deflection of 1/360 of partition height.**
 - 2. **Interior suspended ceiling and soffits – maximum deflection of 1/360 of distance between supports. Coordinate with requirements of metal framing in all hanging situations.**
 - 3. **Contractor shall be responsible to support the total material weights for any new overhead assemblies and shall coordinate with the Architect for new assemblies in**

existing construction to assure overall support. The Contractor shall hire/coordinate with a Professional Engineer for all attachments to assure support.

- E. Fire-Rated Assembly requirements:
1. **Follow all requirements of the U.L. Fire Resistance Directory (current edition) for details of materials and attachments used in all fire-rated assemblies – whether specifically noted herein or otherwise.**

PART 2 - PRODUCTS

2.01 GYPSUM BOARD SYSTEM PRODUCTS:

- A. Available Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Metal Stud and Related Materials
 - a. Dale Industries, Inc.
 - b. Deitrich Metal Framing
 - c. Gold Bond Building Products Division
 - d. Milcor Division
 - e. Clark Steel Framing Systems.
 - f. United States Gypsum Company (USG Corp.)
 - g. Unimast, Inc.
 - h. National Gypsum Co.
 - i. Or Architect approved substitution.
 2. Gypsum Board and Related Products
 - a. Georgia Pacific Corp.
 - b. National Gypsum Co.,
 - c. Gold Bond Building Products
 - d. United States Gypsum Company, USG Corp.
 - e. Or Architect approved substitution.

2.02 METAL PARTITION MATERIALS:

- A. General: **Metal stud framing is a contractor's option in lieu of wood studs noted on the Documents.** Sizes and gage of framing members shall comply with requirements of ASTM C754 unless otherwise indicated.
1. Maximum deflections shall be L/240 at 5 psf. loading.
 2. Shaftwalls shall withstand minimum positive and negative pressure of 5 psf. being applied laterally to surface.
 3. Water resistant gypsum board or cement backer board partitions shall have a maximum deflection of 1/360.
 4. Metal components shall comply with ASTM C645 roll-formed from hot-dipped galvanized steel; complying with ASTM A1003 and ASTM A653 G40 or equivalent corrosion resistant coating.
- B. Framing System Components – steel studs and runners: ASTM C645. Studs: Non-load bearing rolled steel, channel shaped, punched for utility access, 25 gage minimum thickness - unless otherwise indicated or required.
1. Standard depth shall be 3-1/2". Other depths shall be provided as required by assemblies and details.
 2. All shapes shall be galvanized.
 3. Provide 20 gage studs for applications receiving cement backer boards.
 4. Runners: Of same material and finish as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud. Provide ceiling runners with extended legs for ceiling deflection conditions.
- C. Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:
1. [Heavy Duty Studs – HDS] and [Header Bracket – HDSC]
 2. or equal from approved manufacturer.

- D. Furring and Bracing Members: Hat shaped, 'ZEE' – for insulation applications, and other shapes, of same material and finish as studs, thickness to suit purpose. Conform to ASTM C645, GA-216 and GA-600.
- E. Channel Bridging and Bracing: U-Channel Assembly; Base metal thickness of .0538 inch and minimum ½ inch wide flanges. Subject to compliance with requirements, provide one of the following:
 - 1. Dietrich Metal Framing: Spazzer® 9200 Bridging and Bracing Bar
 - 2. or equal
- F. U-Channel Assembly: ¾, 1-1/2 inches and 2 inches
- G. Fasteners: GA 203, Self-drilling, self-tapping screws of type recommended by stud manufacturer.
- H. Metal Backing: 20 gauge thick steel for reinforcement of studs at installation of wall-mounted accessories. **Coordinate with Interior Elevations or Furniture layouts for misc. equipment to be mounted on partitions.**
 - 1. Minimum width of backing shall be 8”.
 - 2. Coordinate exact width requirements with other Documents.
- I. Acoustic Sealant: As specified in Section 07900 – Joint Sealant.
- J. Primer: FSTT-P-645, for touch-up of galvanized surfaces.

2.03 METAL SUSPENDED CEILING AND SOFFIT MATERIALS:

- A. General: Sizes and gage of framing members shall comply with requirements of ASTM C754 unless otherwise indicated.
 - 1. Maximum deflections shall be L/360 at 5 psf. loading.
 - 2. Metal components shall comply with ASTM C645 requirement for metal and with ASTM A 1003/A1003M/A653A, G40 minimum, hot-dip galvanized zinc coating.
- B. Framing System Components – steel studs and runners: Non-load bearing rolled steel, channel shaped, punched for utility access, 25 gage minimum thickness - unless otherwise indicated or required.
 - 1. Standard depth shall be 1/2” deep flange. Other depths shall be provided as required by assemblies and details.
 - 2. All shapes shall be galvanized.
 - 3. Provide 20 gage studs for applications receiving cement backer boards.
 - 4. Runners: Of same material and finish as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud. Provide ceiling runners with extended legs for ceiling deflection conditions.
 - 5. Deflection Track Slotted: Manufacturer’s single, deep-leg, U-shaped steel track: punched with vertical slots in both legs. Steel Sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- C. Furring channels to be roll-formed, hat shaped sections made of 20 ga. corrosion-resistant steel. Furring channels and channel clips to be manufactured from hot-dip, galvanized metal.
 - a. Hat-shaped channels: ASTM C645, 7/8” or 1-1/2” deep.
 - b. Resilient furring channels: ½” deep members designed to reduce sound transmission.
- D. Tie wire to be manufactured from 8 ga. galvanized, soft annealed wire, meeting ASTM A641, Class 1 zinc coating, 0.0625-inch diameter wire, or double strand of 0.0475-inch diameter wire.
- E. Hanger Attachments:
 - 1. Cast-in-concrete anchors: corrosion-resistant materials with loops for hanger wires and capable of supporting, without failure, a load equal to 10 times the dead load of the applied construction weight – as determined by test according to ASTM E1190 by a qualified testing agency.
 - 2. Powder-actuated fasteners: suitable for base material, capable of sustaining, without failure, a load equal to 10 times the dead load of the applied construction weight – as determined by testing according to ASTM E1190 by a qualified testing agency.

3. Drill anchors shall be chemical or expansion anchors, appropriate for the base material, capable of sustaining, without failure, a load equal to 10 times the dead load of the applied construction weight – as determined by testing according to ASTM E1190 by a qualified testing agency.
4. Beam clips, or other similar accessories, shall be capable of sustaining, without failure, a load equal to 10 times the dead load of the applied construction weight.

2.04 GYPSUM BOARD PRODUCTS:

- A. General: Gypsum board shall conform to Federal Specification SS-L-30D; ASTM C1393/C1396M-06 of type as specified hereinafter for each type of board. Wallboard shall be in maximum practicable length to minimize end joints (with no horizontal joints permitted in vertically installed boards, unless wall height exceeds 14'-0"), as follows:
 1. Gypsum Board shall be 5/8" thick typical for wall construction, unless otherwise indicated.
 2. Gypsum Board shall be 1/2" thick typical for ceiling construction, unless otherwise indicated.
 3. Long edges: tapered.
- B. Abuse-Resistant Gypsum Board: per ASTM C36, to resist surface indentation and through-penetration.
 1. **Required Uses: Unless specifically noted otherwise, abuse-resistant gypsum board shall be used for all ceiling and/or Soffit applications.**
 2. Heavy-Duty, gypsum/fiber core wall panel with heavy, abrasion-resistant finish paper and a heavy liner paper on back.
 - a. Similar to Gold Bond, Hi-Abuse Brand wallboard.
 - b. Unless otherwise noted, 5/8" thick, long edge tapered. **Note: curved applications shall be comprised of (2) layers of 3/8" thick material.**
 - c. Fibers added to enhance fire resistance.
 - d. Type 'X'.
 - e. Ceiling board shall meet ASTM C36, and shall be non-sagging.
- C. Tile Backing Board:
 - a. Aggregated portland cement backer board, with woven glass fiber mesh facing, conforming to ANSI A118.9 shall be used as a backer for ceramic tile or veneer plaster/polymer installations in wet locations, 1/2" thick unless otherwise indicated, equal to "DUROCK" Cement Board as manufactured by USG. Provide reinforcing joint tape, ASTM C475, 2" wide for all installations behind tile.
 - b. FIBEROCK® Brand AQUA-TOUGH™ Underlayment, 1/2" in 4'x8' sheets, with square-edge. Fiber-reinforced gypsum product – fire Class A, humidity, mold & abuse resistant.
- D. Water-Resistant Gypsum Board: meeting ASTM C1396, shall be 5/8" thick, similar to Sheetrock Brand MOLD TOUGH panels
 - a. As applicable with fire-rated or abuse-resistant cores where noted or required.
 - b. Panels shall be 1/2" or 5/8" thick as required for spans and material application.
 - c. Typical use for toilet and shower areas not subject to direct moisture.
 - d. This material shall not be used in areas subject to constant moisture such as public shower/tub enclosures, pool or commercial food processing applications.

2.05 TRIM ACCESSORIES:

- A. General: Manufacturer's standard galvanized steel beaded units with flanges for concealment in joint compound, including corner beads, edge trim and control joints. Exposed visible flanges will not be acceptable. Non-corrosive fasteners shall be used for exterior and wet-interior applications.
- B. Installations shall follow manufacturer's recommendations of spacing and application for the material used.
- C. The following materials are as referenced to USG and should be the basis for approval of equals.
 1. External Corner Bead shall be all metal type, equal to a USG DUR-A-BEAD Corner Bead #103 with 1-1/4" wide flanges punched for nailing; designed for concealment of wings by finishing treatment.

2. For installations where partition terminates to dissimilar material or to existing construction: trim shall be all metal type, equal to US Gypsum's #200A 'J-trim' and/or #200B 'L-trim', punched for nailing, designed for concealment of wings by finishing treatment. Install at locations of terminus of gypsum board surfaces.
3. Use US Gypsum's 400 series trim for gypsum board terminations to dissimilar materials that may have differential movement or expansion. This material should also be used for exterior installations of soffits and fascia applications.
4. Use US Gypsum's control joint #093 for typical expansion/control joints (max. spacing – 30 feet on center). Refer to US Gypsum Co.'s handbook for installations in rated assemblies.
5. Backer-supports: 6" wide x 20" (or as required) x 20 gauge minimum; fastened to studs.
6. Metal Closure Angle: Provide sizes as required, in finishes noted or painted.
7. **Aluminum Reveal Mold: All perimeter transitions to walls (or other verticals) shall be made with 1/2" aluminum reveal mold, continuous. This requirement applies to Gypsum Board Systems and Cement Plaster Systems.**
8. Provide factory-made one-piece aluminum reveal mold transitions for all corner joints.

2.06 JOINT TREATMENT MATERIALS

- A. General: ASTM C-475, type recommended by the manufacturer for the application indicated, except as otherwise indicated.
- B. Joint Tape: Provide Perf-A-Tape Reinforcing Tape by USG or equal, centered over all joints and internal corners.
- C. Joint Compound: ready-mixed vinyl type for interior use. Provide 2 separate grades; one specifically for bedding tapes and filling depressions, and one for topping and sanding as recommended and distributed by gypsum panel manufacturer.
- D. Joint compound for tile: cementitious compound per manufacturer.

2.07 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board.
- B. Gypsum Board Fasteners:
 1. Comply with GA-216 for screw type installation. Screws shall be Type "S" bugle-head in length as required, power driven. Provide fasteners of appropriate material for cement board installation in wet areas.
- C. Metal Framing Fasteners:
 1. Power driven screws - ASTM C 954, for fastening panels to metal framing.
 2. Pre-drilled expansion bolts – size as required for loads and base material.
 3. Beam clamps or other mechanical type of attachment – as required of the specific condition.
- D. Acoustical Sealant shall be one of the following:
 1. Tremco Manufacturing Company, "Tremco Acoustical Sealant."
 2. United States Gypsum Company, "USG Acoustical Sealant."
 3. Or Architect approved substitution.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Refer to Architectural, Mechanical, and Electrical Drawings for components located in ceilings. Account for labor, materials, and coordination for all such components.

3.02 INSPECTION:

- A. Installer must examine conditions under which the work of this section shall be performed prior to installation and shall notify Contractor immediately in writing of conditions detrimental to proper and timely execution of gypsum drywall work.

- B. Installer shall not proceed with installation until unsatisfactory conditions have been corrected.
- C. Beginning of installation means Installer accepts existing conditions.

3.03 INSTALLATION OF METAL STUDS AND ACCESSORIES:

- A. Install stud framing per ASTM C754 for partition height and for thickness of assemblies, except where exceeded by other requirements.
- B. Provide cross-bracing at all doors/windows/openings to adjacent walls or to underside of floor above.
- C. Partitions: Extend studs to 6" min. above suspended ceiling height or to underside of floor or roof construction above, as indicated on the Documents.
 - 1. Anchor all studs adjacent to door frames, partition intersections, and corners to deck runner flanges with a special fastener tool. Securely anchor studs to jamb and head anchor clips of door or borrowed light frames by bolt or screw attachment. Over hollow metal doors and borrowed-light frames by bolt or screw attachment. Over hollow metal doors and borrowed-light frames, place a section of runner track horizontally with a web-flange bent at each end. Fasten with one positive attachment per flange. At the location of vertical joints over the door-frame header, position a cut-to-length stud extending to the upper runner.
 - 2. Install studs vertically at spacing as detailed on drawings, or at 16" o.c. minimum if not otherwise indicated. Place two beads of acoustic sealant between studs and adjacent vertical surfaces. **Provide fire-rated sealant where fire-rated walls are indicated.** Achieve air seal between studs and adjacent vertical surfaces to provide specified wall sound transmission coefficient (STC) rating.
 - 3. Stud splicing is not permitted.
 - 4. Maximum Variation from True Position: 1/8 inch. Maximum Variation of any Member from Plane: 1/16 inch.
 - 5. Coordinate with installation of sound batts for all sound attenuation partitions. This may occur in the stud space or above the partition in the ceiling space. Coordinate with Details.
 - 6. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, architectural casework, toilet accessories, finish hardware, and all other miscellaneous wall mounted accessories.
 - 7. Refer to drawings for details of partitions extending to ceiling only and for partitions extending through ceiling to structure above. Provide slip type joint under structural building members to avoid deflection transfer to studs, while maintaining specified wall fire or sound rating. Provide extended leg ceiling runners where detailed or required.
 - 8. Do not bridge building control and expansion joints with steel framing. Frame both sides of joints independently.
 - 9. Install steel framing and furring members so fastening surfaces vary not more than 1/8" from the plane formed by the faces of adjacent framing.
- D. Acoustical Ceiling Suspension System:
 - 1. Installation to be in accordance with ASTM C636 and manufacturer's recommendations.
 - 2. Hanger wires to be spaced at a maximum of 48" on center. Provide additional hanger wires where light fixtures and/or air supply and return units occur in the ceiling; provide a minimum of four (4) wires per item.
 - 3. Do not support wires from mechanical or electrical equipment, piping, or any other equipment occurring above the ceiling.
 - 4. Install hold down clips when infill materials weigh less than 1.0 pounds per square foot.
- E. Bulkheads and Soffits: Extend studs to height indicated, bracing as required.
 - 1. Coordinate installation of ceiling suspension systems/soffits with installation of overhead construction, or existing materials, to ensure that inserts and/or attachments for hanging assemblies shall adequately support all applied loads.
 - 2. Provide and install all required inserts, attachments and/or anchors to adequately support new construction.

3. **For Renovations: Verify all existing materials will support new construction with proposed attachment means.**
- F. Drywall Ceiling Suspension System:
 1. Hanger wires to be spaced at a maximum of 48" on center. Provide additional hanger wires where light fixtures and/or air supply and return units occur in the ceiling; provide a minimum of four (4) wires per item.
 2. Install carrying channels at 48" o.c. and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channels. Provide 1" clearance between runners and abutting walls. All ceiling construction shall be fully "unrestrained". Interrupt main runners, furring, or wallboard ceilings at walls of all full sized rooms as required to accommodate building movement. At channel splices, interlock flanges, overlap ends 12" and secure each end with a double strand of 18 ga. tie wire.
 3. Erect metal furring channels at right angles to carrying channels. Space furring within 6" of wall. Provide 1" clearance to carrying channels with furring channels clips installed on alternate sides of carrying channel. At splices, nest-furring channels with at least 8" overlap and securely wire-tie each end with a double strand of 18 ga. tie wire. Screw furring to wood framing.
 4. At light fixtures or other openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore the lateral stability of grillage. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 5. Do not support wires from mechanical or electrical equipment, piping, or any other equipment occurring above the ceiling.
 6. **For Renovations: Verify all existing materials will support new construction with proposed attachment means.**
- G. Blocking and bracing: Install blocking and bracing as recommended by manufacturer of particular equipment.
 1. Coordinate required framing/blocking for all overhead braced equipment and installations – in particular, toilet partitions.
- H. Install wall furring and resilient channels in accordance with manufacturer's recommendations.
 1. Resilient channels shall be fastened in single flange in accordance with manufacturer's instructions.
 2. On solid walls, install channels vertically.
- I. Steel Stud Systems as Ceiling Assemblies:
 1. Installation to be in accordance with ASTM C636 and manufacturer's recommendations.
 2. Hanger wires to be spaced at a maximum of 48" on center. Provide additional hanger wires where light fixtures and/or air supply and return units occur in the ceiling; provide a minimum of four (4) wires per item.
 3. Do not support wires from mechanical or electrical equipment, piping, or any other equipment occurring above the ceiling. At light fixtures or other openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore the lateral stability of grillage.
 4. Install carrying channels at 48" o.c. and within 6" of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channels. Provide 1" clearance between runners and abutting walls. At channel splices, interlock flanges, overlap ends 12" and secure each end with a double strand of 18 ga. tie wire.
 5. Install hold down clips when infill materials weigh less than 1.0 pounds per square foot.

3.04 INSTALLATION OF GYPSUM BOARD:

- A. In addition to compliance with ASTM C840 and GA-216, comply with manufacturer's instructions and requirements of fire resistance ratings whichever is most stringent. Comply

- with requirements of ANSI A108.11 and manufacturer's recommendations for cement board installation.
- B. Install ceiling boards prior to wall/partition boards and in the direction and manner that will minimize the number of end-butt joints and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 1'-0". Butt panels with not more than 1/16" of open space between panels.
 - C. Where indicated or required, install acoustical insulation prior to installation of gypsum board.
 - D. Install wall/partition boards horizontally using maximum length sheets available so as to minimize end-butt joints. Install boards with end joints staggered over studs. Form control and expansion joints with space between edges of adjoining gypsum panels.
 - E. Where recommended by manufacturer, install gypsum board with "floating" internal corner construction.
 - F. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members using resilient channels, or provide control joints to counteract wood shrinkage.
 - G. Space fasteners in gypsum boards in accordance with GA-216 and manufacturer's recommendations. Fasten with screws. Space fasteners for cement board in wet locations in accordance with manufacturer's recommendations.
 - H. Where partitions intersect mechanical equipment, joists or other structural members, cut gypsum panels to fit profile of interference; allow 1/4" to 3/8" wide joints and install sealant/firecaulk where required.
 - I. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4" to 1/2" wide spaces at these locations, and trim edges with appropriate trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
 - J. Partitions, soffits or other assemblies within occupant reach or with painted or vinyl finishes shall be constructed to meet L/240 deflection criteria.
 - K. Partitions, or assemblies where the final finish is a rigid veneer, such as plaster, skim coat, tile or stone shall be constructed to meet L/360 deflection criteria.
 - L. Partitions, unexposed to the occupant, shall meet L/120 deflection criteria.
 - M. Provide gypsum board 'control joints' as required by GA-216, best practices and at:
 1. a maximum of 30' o/c for walls.
 2. a maximum of 50' o/c for ceiling planes.
 3. at transitions with large, 'open areas' in wall construction. Coordinate with the Architect in the field for exact locations.
 4. at less than 30' o/c where required by complicated details or large areas of gypsum construction.
 5. where indicated in the Contract Documents

3.05 INSTALLATION OF DRYWALL TRIM ACCESSORIES:

- A. Use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports or fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.
- B. Install metal corner beads at external corners of drywall work.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed. Provide type with face flange to receive joint compound. Install 'L-type' trim where work is tightly abutted to other work. Install 'J-type' trim where edge is exposed.

3.06 INSTALLATION OF SPECIAL GYPSUM BOARD INSTALLATIONS:

- A. Curved Partitions:
 1. Cut top and bottom track through leg and web at 2-inch intervals.
 2. Bend track to uniform curve and locate straight lengths so they are tangential to arcs.
 3. Begin and end each arc with a stud, and space studs equally through arc.
- B. Acoustical Partitions:
 1. Lay all runners in mastic or caulk.
 2. Caulk all top and bottom joints between the wallboard and structure.

3. Tape other joints and spackle airtight.
 4. Coordinate with Documents for layers of wallboard on each side of framing and for installation of sound batts.
- C. Furring Framing:
1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches o/c.
 2. Attach narrow flanges of furring members to wall with appropriate fasteners at 24" o/c.
 3. Install vapor barrier as part of furring assembly where indicated.

3.07 INSTALLATION OF DRYWALL FINISHING

- A. Apply joint treatment at gypsum board joints, both directions, internal angles, flanges of trim accessories, penetrations, fastener heads, surface defects and elsewhere as required to prepare work for decoration. Pre-fill open joints using type of compound recommended by manufacturer.
- B. Apply joint compound in 3 coats (not including pre-fill of openings in base), and feather out onto panel faces. Sand between all coats and after last coat.
- C. Prior to field-applied painting, gypsum drywall surfaces shall be smooth, dense, free of surface defects including (but not limited to) gouges, scrapes, nail or screw "pops". Joints shall be fully treated as to be invisible
- D. Finish wallboard to "Levels of Drywall Finish" as noted in GA-214-90 Level of Gypsum Board Finish and as follows for typical applications:

Level 0

Level 0 is used only in temporary construction or if final decoration is undetermined. No taping or finishing is required.

Level 1

Level 1 finish is recommended in areas that would generally be concealed from view. All joints and interior angles shall have tape set in joint compound. Tape need not be covered with joint compound to fulfill the requirements of Level 1. In Level 1, the surface is left free of excess joint compound. Ridges and tool marks are acceptable for a Level 1 finish. This level is often specified in the plenum area above ceilings, in attics, or in service corridors.

Level 2

Level 2 shall be used where surfaces are concealed to view or where specifically permitted by name in the Drawings. As an example, Level 2 is allowed where moisture-resistant gypsum board is used as a tile substrate. All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Joint compound is applied over all fastener heads and beads. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level. The surface is left free of excess joint compound. Ridges and tool marks are acceptable for a Level 2 finish.

Level 4 – Typical installation unless noted otherwise.

All joints and interior angles have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compounds shall be smooth and free from tool marks and ridges. Before final decoration it is recommended that the prepared surface be coated with a drywall primer prior to the application of final finishes. Gloss, semi-gloss and enamel paints are not recommended over a Level 4 finish.

END OF SECTION 09250

SECTION 09300 - TILE**PART 1 - GENERAL**1.01 **WORK INCLUDED:**

- A. Furnishing all labor, materials and equipment necessary for a complete installation of all floor tile, coved and/or coveless bases, in sizes and shapes as shown on the drawings or specified herein.
- B. Provide and set all thresholds associated with tile work or elsewhere as required.
- C. Coordinate tile work with toiletroom accessories and other equipment.
- D. Work of this section shall include modification of existing floor slopes in areas to receive floor tile as indicated on Drawings or required in the Field.
- E. **Provide and install an anti-fracture/crack isolation membrane (meeting ANSI A118.12) for ceramic floor tile installations for thin-set floor tile.** Provide and install a protective, penetrating sealer to all floor grout lines, as indicated elsewhere in these specifications or Documents.

1.02 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 09250 - Gypsum Drywall Systems
- B. Section 07900 - Joint Sealers
- C. Section 10800 – Toilet Accessories
- D. Division 15000 - Plumbing Specialties: especially for floor drains and shower
- E. **Refer to the Tile Council of America, Inc. (TCA) handbook, 2013 (or latest edition) referenced herein. Coordinate with the latest edition of the TCA for all assemblies noted herein.**

1.03 **REFERENCE STANDARDS:**

- A. ANSI A108.1 – General Requirements: Subsurfaces and Preparations by Other Trades.
- B. ANSI 108.1A - Installation of Ceramic Tile with Portland cement Mortar.
- C. ANSI A108.4 - Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive.
- D. ANSI A108.5 - Installation of Ceramic Tile with Dry Set Portland cement Mortar or Latex Portland Cement Mortar.
- E. ANSI A108.6 - Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy.
- F. ANSI A108.8 - Installation of Ceramic Tile with Chemical Resistant Furan Mortar and Grout.
- G. ANSI A108.9 - Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout.
- H. ANSI A108.10 - Installation of Grout in Tile work.
- I. ANSI A118.1 - Dry Set Portland cement Mortar.
- J. ANSI A118.3 - Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive.
- K. ANSI A118.4 - Latex Portland cement Mortar.
- L. ANSI A118.5 - Chemical Resistant Furan Mortars and Grouts for Tile Installation.
- M. ANSI A118.6 – Standard Ceramic Tile Grouts.
- N. ANSI A118.7 – Polymer Modified Tile Grouts for Tile Installations
- O. ANSI A118.8 Modified Epoxy Emulsion Mortar/Grout
- P. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.
- Q. ANSI A137.1 Standard Specifications for Ceramic Tile - for Floor installations
- R. **Refer to: TCA (Tile Council of America) - Handbook for Ceramic Tile Installation, (latest edition) as the standard for installation material and procedures. Any TCA detail noted as reference herein shall be referenced to the latest edition of the TCA.**

1.04 **SUBMITTALS:**

- A. Submit manufacturer's descriptive literature and actual samples of material to Architect for review and color selection before materials are shipped to the site.

- B. Submit full pieces of tile (multiples if a color range occurs) and a min. 6" piece of threshold material.
 - C. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions, including preparatory work and sequencing. **Submit TCA installation requirements and materials required for each installation whenever possible.**
 - D. **All floor tile shall meet achieve a minimum Dynamic Coefficient of Friction of 0.42 D.C.O.F. as tested according to ANSI 137.1. The Contractor shall have the responsibility to notify the Architect during the Shop Drawing Review process for any material that does not meet this slip resistance criteria.**
- 1.05 ENVIRONMENTAL CONDITIONS:
- A. All concrete substrates shall be properly cured and dry prior to installation of the tile or any associated preparation work.
 - B. Maintain minimum temperature at 55° F. during installation and for fourteen days thereafter.
 - C. Have proper lighting and ventilation during installation.
 - D. Do not install adhesives in an unventilated environment.
 - E. Vent temporary heaters to outside to avoid carbon monoxide damage to new tile work.
- 1.06 QUALITY ASSURANCE:
- A. Perform Work in accordance with ANSI A137.1.
 - B. Conform to TCA Handbook – latest edition, wherever applicable.**
 - C. Submit confirmation of adhesives, mortars, grouts and other installation materials:
 - 1. with proper usage of specified materials per manufacturer's recommendations
 - 2. with proper compatibility of specified materials per manufacturer's recommendations
 - D. Maintain one copy of each document on site.
- 1.07 QUALIFICATIONS:
- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.
 - B. Installer: Company specializing in performing the work of this section with minimum three years documented experience.
- 1.08 DELIVERY, STORAGE, AND HANDLING:
- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
 - B. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.
 - C. Deliver all products to job site in manufacturer's unopened containers with grade seals unbroken and labels intact. Keep materials dry.
 - D. Extra Stock: An additional three (3) percent of each size and color of tile shall be delivered to Owner for future use.
- 1.09 INCONSISTENCIES:
- A. Refer to Section 00100 – Instructions to Bidders for General Contractor, Construction Manager, and/or sub contractor responsibilities pertaining to Specification inconsistencies.

PART 2 - PRODUCTS

GENERAL INFORMATION: PART 2 – TILE PRODUCTS is divided into 3 subsections: Part 2A - Wall Tile, Part 2B - Floor Tile and Part 2C - Special Installations. Each Section may have particular materials, manufacturers and product installation methods and specialties required. Coordinate with all Product Section requirements relative to Installation Requirements, which may be additionally noted in PART 3 – EXECUTION.

PART 2B – FLOOR TILE–SYSTEMS AND MATERIALS**2B.01. CERAMIC FLOOR TILE:**

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Crossville
 - 2. Dal-tile
 - 3. American Olean
 - 4. Winburn
 - 5. Summitville Tiles, Inc.
 - 6. Or Architect approved substitution under provisions of Section 01600.
- B. Ceramic Floor Tile of size, patterns and colors as indicated on Documents or noted herein; colors and size will vary according to details, manufacturer and applications - conforming to the following:
 - 1. Type: Impervious porcelain similar to Cross-Colors Mingles by Crossville, or equal.
 - 2. Finish: Honed/Unpolished
 - 3. Size(s): 8" x 8" x 5/16" size
 - 4. Color: To be selected by Architect from full A-Series range
 - 5. Coefficient of Friction: 0.6 minimum, wet and dry.
- C. Ceramic Base and Trim Units: Match floor tile for type, finish and color. Use 4" h. (min.) straight base.
 - 1. Base joints shall align with floor joints whenever possible – coordinate with Architect in the field.
 - 2. Coordinate base with Wall Tile installation requirements
 - 3. Coordinate square/thin-lip/flush base installation with floor tile.
- D. All **floor tile** shall achieve a minimum D.C.O.F. of 0.42 (Dynamic coefficient of friction) for level surfaces as tested according to ASTM A137.1-2012.
 - 1. Sloped, tiled walkways shall have a minimum D.C.O.F of 0.46.
 - 2. Notify the Architect during the Shop Drawing Review process for any material that does not meet this slip resistance.

2B.02. FLOOR TILE LEVELING BED MATERIALS:

- A. Where required to create/level/meet slopes, or where Drawings indicate existing floor slopes are to be modified by installing leveling bed materials, the leveled areas shall be fully adhered to the existing floor and provide a smooth, permanently hard substrate suitable for installation of ceramic floor tile as specified.
- B. For field prepared cement mortar leveling bed where thickness will exceed 3/4":
 - 1. Portland Cement: Shall conform to ASTM C 150 Type 1, gray.
 - 2. Hydrated Lime: Shall conform to ASTM C 206 or C207 Type S.
 - 3. Sand: Shall conform to ASTM C 144.
 - 4. Latex Additive as required:
 - a. Summitville S-800 Setting Acrylic Latex Additive
 - b. Hydroment #425 Multi-Purpose Acrylic Latex Mortar Additive
 - c. or Architect approved substitution.
 - 5. Mix: Mix and proportion leveling bed in strict accordance with ANSI Standard Specifications and TCA Handbook for Ceramic Tile Installation, unless more stringent requirements are specified within this section.
- C. If leveling bed will not exceed 3/4", a pre-mixed "medium bed" mortar with a latex additive is required.
 - 1. Acceptable Product/Manufacturer:
 - a. Medium Bed Mortar and Thin-Set Mortar Admix by Custom Building Products
 - b. Hydroment Medium Bed Mortar and Hydroment #425 Multi-Purpose Acrylic Latex Mortar Additive by Bostik Tile
 - c. Or Architect approved substitution. Prepare in strict accordance with manufacturer's instructions.

2B.03. FLOOR TILE THIN-SET SETTING BED/BOND COAT MATERIALS:**A. For light commercial and residential on wood deck and joists**

1. Where water resistance is desired but a typical thin-set mortar installation is suggested use a waterproof membrane per ANSI A118.10, and coordinate with requirement below.
 2. Use dry-set mortar on structurally sound plywood structure as filler for underlayment panels.
 3. Confer that existing plywood is in two layers as required, with gaps between sheets as required by system installation - per **TCA F150-16**.
 4. Use Latex Modified Portland Cement Setting Mortar. Shall conform to or exceed ANSI A118.4. Use only a manufacturer's designated mortar for above grade slabs.
 - a. Mortar:
 - 1) Megaflex by Custom Building Products
 - 2) Laticrete Sure Set, or better
 - 3) Hydroment PM, as polymer-modified thin-set
 - 4) or equal
 5. Install Waterproof membrane: meeting ANSI 118.10 as required
 - a. Redgard by Custom Building Products
 - b. Laticrete Hydro Ban
 - c. HydraFlex by TEC
 - d. Hydroment Ultra-Set Advanced or Gold (less of a waterproofing material)
 - e. or equal
 6. Grout shall conform to ANSI A10.11 for typical installations. See Grout selections for other options.
 7. Transition spanning fabric:
 - a. Treat all cracks or changes in level per TCNA F125 or F125A with fiberglass mesh into membrane coating.
 - b. As recommended by Manufacturer of membrane.
 8. **Refer to TCA F144-16 and/or F150-16** for additional information and requirements.
- B. Accessories for above applications - required:**
1. **Cleavage Membranes shall be a component** of typical installations noted above and shall be installed as noted below:
 - a. Install Cleavage Membranes over cracks/patches in existing floor to receive new tile finishes.
 - b. Acceptable Manufacturers:
 - 1) Redgard by Custom Building Products, meeting ANSI 118.10
 - 2) "ECB" (Elastomeric Crack Bridging) Anti-Fracture Membrane and #169 Primer by National Applied Construction Products, Inc., Canal Fulton, OH; 330-854-9622.
 - 3) LATICRETE Blue 92 Anti-Fracture Membrane, with accessories as required.
 - 4) Or Architect's approved substitution.
 2. Latex Modified Portland cement Setting/Bond Coat Mortar: Shall conform to ANSI A118.4. Shall be type as recommended by manufacturer of primary tile materials such as Summitville S-1000 MP (Multi-Purpose) Premium Thin Set Latex Mortar, or Architect approved substitution. Prepare in strict accordance with manufacturer's instructions.
 3. Liquid applied waterproofing membrane: Shall conform to ANSI A118.10.
 - a. Redgard by Custom Building Products, meeting ANSI 118.10
 - b. Laticrete Hydro Ban
 - c. HydraFlex by TEC
 - d. Or Architect's approved substitution with 10 year minimum warranty for water penetration.
 4. Metal edge trims as required or noted in the Documents.
 - a. Manufacturer of metal edge trim: Schlüter Systems, 800-472-4588
 - b. See Documents for type or model required.
 - c. or for material applications and installation requirements

2B.04. FLOOR TILE GROUTING MATERIALS:

- A. **See individual Specification paragraphs above for particulars on grout materials and installation procedures as required of specific installation systems per TCA Installations**
- B. In general:
1. Grout –either powder or pre-mix material as a high-performance installation:
 - a. Provide a single component formula composed of advance polymers with inorganic fillers and pigments. Complies with ANSI A118.7 and A118.3.
 - b. Stain and mold resistant by material and chemical properties, with built-in Microban antimicrobial protection.
 - c. Joint widths between 1/16" to 1/2" – coordinate with manufacturers recommendations.
 - d. Do not use in submerged applications.
 - e. Install per ANSI A108.10.
 - f. Does not required a sealer for the grout installation.
 - g. Acceptable Products:
 - 1) Fusion Pro Grout by Custom Building Products
 - 2) Power Grout by TEC
 - 3) or equal
 - h. Refer to TCA book for special chemically resistant grouts.
- C. Acceptable manufacturers of typical grout:
1. Laticrete
 2. Hydroment
 3. TEC
 4. Custom Building Products
 5. or equal
- D. Color: To be selected by Architect from manufacturer's full Group 1 range.
- E. Grout Mix: Mix and proportion grout materials in strict accordance with manufacturer's instructions, ANSI Standard Specifications and TCA Handbook for Ceramic Tile Installation, unless more stringent requirements are specified within this section.

2B.05. MEMBRANES:

- A. General:
1. Membranes noted below are to be installed in the system applications noted above and as required by detailing as noted in the Documents.
 2. Membrane products shall meet or exceed specification noted below for particular installations.
- B. Waterproofing Membrane to be thin, cold applied, single component liquid and load bearing. Reinforcing fabric to be non-woven rot-proof specifically intended for waterproofing membrane. Waterproofing Membrane to be non-toxic, non-flammable, and non-hazardous during storage, mixing, application and when cured. It shall be certified by IAPMO and ICC approved as a shower pan liner and shall also meet the following physical requirements:
1. Water Permeability @ 30ft.hydro/0.9 atmos. /91.2kPa (Fed. Spec. TT-C-00555 Modified): Nil
 2. Elongation @ break (ASTM D751): 20-30%
 3. Service Temperatures (LIL 1016): -20° to 280°F(-28° to 137°C)
 4. Breaking Strength (ASTM D751): 2950 psi (20.4 MPa)
 5. Thickness (LIL 1013): 20 mils (0.5 mm)
 6. Shear Bond Strength (ANSI A118.4): 250 PSI (1.7 MPa)
 7. Service Rating (TCA/ASTM C627): Extra Heavy/cycles 1-14
 8. Total VOC Content: < 0.05 mg/m3

2B.06. FLOOR TILE ACCESSORIES:

- A. Leveling material:
1. Install a cementitious setting bed or self-leveling material as required to smooth depression and/or voids, or revise floor to match slopes.
 2. Self-leveling material shall meet requirements of ASTM C627 for intended use.
- B. Floor Tile Edge Trim:
1. Tile to Sheet/VCT/Rubber Flooring intersection:

- a. Install single-flanged stainless steel/anodized aluminum edge trims at junctions between ceramic floor tile and other flooring material.
 - 1). Acceptable Manufacturers:
 - a). Schlüter-SCHIENE-E by Schlüter Systems, 800-472-4588
 - b). or equal
 - 2). Select size according to floor tile thickness.
 - 3). Install in strict accordance with manufacturer's recommendations.
- C. Thresholds:
 - 1. Full width of wall or frame opening, beveled both sides, or as required between dissimilar material heights, at a maximum slope of 1:2 with a 1/2 inch maximum floor level change at threshold to meet current Barrier Free codes, and to accommodate floor finishes on each side of threshold.
 - 2. Synthetic (solid polymer) threshold: made from homogeneous solid sheets of filled plastic resin
 - a. Corian
 - b. or approved equal

PART 3 – EXECUTION:

3.01 PREPARATION:

- A. Before tiling, surface shall be checked for variations in surface level, which shall not exceed the maximum variations listed below:
 - 1. For 8" x 8" paver tile thru 18" x 18" tile – the maximum variation shall be 1/4" in 10 feet.
 - 2. For 2" x 2" and 4" x 4" floor tile – the maximum variation shall be 1/8" in 10 feet.
- B. Report all unacceptable surfaces to the Architect, and do not tile surfaces until they are leveled properly. Beginning tile work constitutes acceptance of subfloor.
 - 1. Allow new concrete slabs to cure for no less than 28 days before installing tile.
 - 2. Coordinate substrate curing and any applied finishes with the requirements of the tile installation.
- C. **Determine termination/transitions of all tile installation to adjacent material before starting work. Coordinate with adjacent material and thresholds for tile spacing and setting beds.**
- D. **Determine locations of all expansion and/or control joints before starting work. See Section 3.03 – Special Installation Procedures below for additional information.**
 - 1. Provide a layout to the Architect of all joints prior to installation, and include materials, details and procedures for installing joints.
 - 2. All substrate joints shall be reflected in the tile work as expansion/control joints.
- E. Countertop supports to be in place and secured before countertop installations.

3.02 INSTALLATION:

- A. Supply first class workmanship in all tile work. Install leveling bed (where required), cleavage/anti-fracture/waterproof membranes and primer (where required), setting bed/bond coat, edge trim, tile, sealant joints and grout in accordance with each manufacturer's instructions and the **TCA Handbook for Ceramic Tile Installation, latest edition.**
 - 1. **Install water-proofing membrane and primer over existing floor substrate regardless of overall design and specification requirements, and as required by details of the Documents.**
 - 2. Install leveling bed materials as indicated on Drawings and where required to create a properly flat surface for thin set tile installation and/or as required to create the appropriate slopes and pitches to drains or transitions between areas.
- B. **Lay tile to pattern indicated on Drawings, or, if not indicated in the Contract Documents, request tile pattern from Architect for complicated situations. Typical considerations shall be:**
 - 1. The main Entry or focus of the space shall have priority when laying out tile if any conflicts occur.

2. The Tile Contractor shall develop tile layouts to eliminate, or at least minimize tile under a ½ piece. Coordinate with Architect if a specific layout plan is not detailed and the proposed layout does not balance in the space.
3. Do not interrupt tile pattern through openings unless noted to do so in the Documents.
- C. **Place metal/resilient edge trim** at locations detailed on Drawings, Schedules and/or specified herein. Edge trim is typically required at terminations of tile and interface with other floor/wall materials.
- D. **Grouting and Joints:**
 1. Align all floor joints to result in straight uniform grout lines; adjust as required for an overall parallel appearance with surrounding walls. Align floor tile joints with base or wall tile joints where tile modules are the same.
 2. Joint width shall be uniform, subject to variance in tolerance allowed in tile size.
 3. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
 4. All colored grouts shall end uniformly and shall not 'bleed' into adjacent grout colors.
 5. Provide sealants and back-up rods as required. Coordinate with Architect to match sealant color and texture with typical grout installation.
 6. Prepare joints and apply sealants to comply with requirements of referenced standards and sealant manufacturer.
 7. Keep any expansion and other sealant filled joints free of tile adhesive or grout.
- E. **Cut and fit tile neatly** around penetrations through tile and provide proper expansion joint caulk/sealant around penetrations in accordance with TCA Handbook for Ceramic Tile Installation, latest edition.
- F. Form corners neatly. Smooth all visible cut edges. Where pre-molded outside corner pieces are not available, use bullnosed edge tile to "ease" tiled corners - unless note otherwise.
- G. Allow tile to set for a minimum of 48 hours prior to grouting or in accordance with manufacturer's instructions and the TCA Handbook for Ceramic Tile Installation.
- H. Floor tile shall be placed under all fixed casework unless noted otherwise.

3.03 SPECIAL INSTALLATION PROCEDURES:

A. **Movement Joints in Tile Work –**

1. Locate expansion joints and **other sealant filled joints** (including control, contraction and isolation joints) typically where:
 - a. **Note 3.03 A.3-c below for typical joint spacing requirements.**
 - b. floor tile meets perimeter walls
 - c. at level changes
 - d. **over expansion/contraction joints in substrate, with the appropriate cleavage membrane installation**
 - e. For all concrete joints running at an angle to the tile joinery, coordinate cleavage membrane and tile joints and propose detailed installation to Architect
 - f. and where indicated on Drawings
2. Tile joints should not be cut after setting.
3. **Provide layout of movement and/or construction joints for all large areas of construction to the Architect for review prior to installations.**

3.04 GROUTING:

- A. Grout per manufacturer's directions and industry standards are to be followed as to grouting procedures and precautions. Coordinate with tile manufacturer's recommendations for preparing the tile for grouting.
- B. Remove all grout haze, strictly observing grout and tile manufacturer's recommendations as to the use of chemical cleaners. Use of acid is not permitted.
- C. Rinse tile work thoroughly with clean water before and after use of chemical cleaners. Follow grout manufacturer's recommendations as to grouting procedures and precautions. Comply with ANSI/TCA A108.10 - Installation of Grout in Tile work and TCA Handbook for Ceramic Tile Installation.

3.05 CLEANING AND PROTECTION:

- A. Apply to all clean, completed tile floors a protective coat of neutral cleaner solution to remove dirt and grout haze soon after grout has set. In addition, cover all the tile floors with heavy-duty, non-staining construction paper, taped in place for period of construction prior to Final Acceptance of Work.
- B. Just before Final Acceptance of tilework, remove paper and rinse protective coat of neutral cleaner from all tile surfaces.
- C. Prohibit all foot and wheel traffic from newly tiled floors for minimum three days, seven days preferable to allow all material to set properly.
- D. Place large, flat boards in walkways and wheelways for seven days where use of newly tiled floors with cement type grout is unavoidable.

END OF SECTION 09300

SECTION 09510 - SUSPENDED ACOUSTIC CEILINGS**PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. Suspended metal grid ceiling system and standard perimeter trim.
- B. Acoustic tile and panels
- C. Coordinating with gypsum drywall systems to conform to proposed grid system
- D. Coordinate with other building systems – mechanical/electrical/plumbing etc. to minimize conflicts and verify installation height of ceiling.
- E. Perimeter trim – custom or manufacturer's special shapes – for lay-in grid system
- F. Coordinating new ceilings with existing ceilings and soffits

1.02 RELATED SECTIONS:

- A. Section 07200 - Batt Insulation
- B. Section 09100 – Metal Support Systems
- C. Section 09250 – Gypsum Drywall System
- D. Division 15 - Mechanical: Air diffusion devices in ceiling system
- E. Division 16 - Electrical: Light fixtures in ceiling system.

1.03 REFERENCES:

- A. ASTM C635 - Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
- B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
- C. ASTM C665 - Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- D. ASTM E580 - Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint
- E. ASTM E1264 - Classification of Acoustical Ceiling Products
- F. CISCA (Ceilings and Interior Systems Contractors Association) - Acoustical Ceilings: Use and Practice.
- G. UL - Fire Resistance Directory
- H. WH (Warnock Hersey) - Certification Listings.

1.04 SYSTEM DESCRIPTION:

- A. Installed System: Conform to UL Design for ceiling and floor and ceiling and roof assembly as indicated on Drawings
- B. Suspension System: Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1:240.

1.05 SUBMITTALS FOR REVIEW:

- A. Section 01300 - Submittals: Procedures for submittals
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system and other pertinent information as requested by Architect.
- C. Samples: Submit two samples, 6 x 9 inches in size, indicating material and finish of acoustic units and appropriate colors.
- D. Product Data: Provide data on metal grid system components, acoustic units and accessories.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.06 QUALITY ASSURANCE:

- A. Conform to CISCA requirements.

- B. Grid Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Acoustic Unit Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.
- D. Coordination: Installer shall examine drawings and specifications of all trades which interface with work of this section, so as to be familiar with materials, products, and conditions which might affect extent or manner of acoustical ceiling work.

1.07 REGULATORY REQUIREMENTS:

- A. Conform to applicable code for fire rated assembly and combustibility requirements for materials.
- B. UL Fire Hazard Classification: Provide panel units which have been tested, rated and labeled by UL for ratings as listed in the "Classified Building Materials Index" by UL, as follows:
Class A - Maximums of 25 for flame spread, fuel contributed, and smoke developed.

1.08 ENVIRONMENTAL REQUIREMENTS:

- A. Section 01600 - Material and Equipment: Environmental conditions affecting products on site
- B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.
- C. Space Enclosure: Do not install interior acoustical ceilings until space enclosed and weatherproof, and until wet-work in the space completed and nominally dry, and until work above ceilings completed and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.09 PROJECT CONDITIONS:

- A. Section 01039 - Coordination and Meetings
- B. Sequence work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust-generating activities have terminated, and overhead work is completed, tested, and approved.
- C. Install acoustic units after interior wet work is dry.

1.10 EXTRA MATERIALS:

- A. Section 01700 - Contract Closeout
- B. Provide two (2) percent of total acoustic unit area of each type of tile used, to Owner.

PART 2 - PRODUCTS

2.01 SUSPENSION SYSTEM MATERIALS:

- A. Manufacturers:
 - 1. Donn Products, Inc. (USG)
 - 2. Chicago Metallic Corp.
 - 3. Armstrong
 - 4. Substitutions: Refer to Section 01600 - Material and Equipment.
- B. Non-fire Rated Grid: ASTM C635, intermediate; exposed T; components die cut and interlocking
- C. Grid Materials: Manufacturer's standard exposed runners, cross-runners and accessories of the types of profiles indicated, with exposed cross runners coped to lay flush with main runners.
 - 1. Commercial quality cold rolled steel with galvanized coating for standard, interior applications.
- D. Exposed Grid Surface Width: 15/16". Coordinate with special ceiling systems chosen or special edge conditions.
- E. Grid Finish: white manufacturer's standard manufacturer's premium colors. Coordinate with special ceiling systems chosen.
- F. Accessories: Stabilizer bars, clips, splices, perimeter moldings.

- G. Support Channels and Hangers: Size for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung.
 - 1. Hanger Wires: Galvanized carbon steel, ASTM A 641, soft temper, pre-stretched, yield-stress load of at least 3 times design load, but not less than 12 gauge (0.106").
 - 2. Coordinate with height of structural frame from which ceiling is suspended; additional hanging wire and heavier gauge wire may be required.
 - 3. Galvanized steel; size and type to suit application, code requirements and ceiling system flatness requirement specified. **Provide the appropriate hanger gage, and finish for high humidity areas when supporting hot dipped galvanized grid system.**
- H. Coordinate with other work supported by or penetrating through the ceilings, including (as applicable) light fixtures, sprinkler systems, HVAC equipment and wall or partition closures to deck above.
- I. Structural Class: Intermediate duty systems, except where quantity or weight of ceiling fixtures would create deflection of greater than 1/360 of the span length: either use "heavy duty" system or reinforce ceiling grid in manner to maintain deflection less than 1/360 of span length.
- J. Support recessed light fixtures by main runners on two opposite sides.

2.02 ACOUSTIC PANEL MATERIALS:

- A. Standard for Acoustical Ceiling Units: Provide manufacturer's units of configuration indicated which are prepared for mounting method designated and which comply with FS SS-S118 requirements, including those indicated by reference to type, form, pattern, grade (NRC or NIC' as applicable), light reflectance coefficient (LR), edge detail, and joint detail (if any).
- B. Some tile patterns/styles are universal and may be provided by an alternate manufacturer if available. If a unique tile pattern/style is noted below it shall be provided as specified. If a generic tile pattern/style is described below, the contractor shall be allowed to provide from the manufacturers noted below.
- C. Manufacturers:
 - 1. Armstrong World Industries
 - 2. Celotex Corporation.
 - 3. USG
 - 4. Substitutions: Refer to Section 01600 - Material and Equipment.
- D. Acoustic tile Types shall conform to ASTM E1264 and be:
 - 1. **Type 1 - conforming to the following:**
 - b. **Size: 24 x 48 inches – Fissured Minatone #779 or equal**
 - c. **Thickness: 5/8 inches**
 - d. **Composition: Mineral**
 - e. **Fire Hazard Classification: Class A**
 - f. **Edge: Square cut, lay-in**
 - g. **Surface Color: White**
 - h. **Surface Finish: Non-directional fissured.**

2.03 ACCESSORIES:

- A. Acoustic Insulation: ASTM C665, friction fit type, unfaced; 2 inches thick, size cut to fit acoustic system. Coordinate with Reflected Ceiling Plans.
- B. Gypsum Board: Standard and/or Fire rated type; 5/8 inch thick, ends and edges square, paper faced. Coordinate with Reflected Ceiling Plans.
- C. Acoustic Sealant For Perimeter Moldings: Coordinate with Section 07900.
- D. Touch-up Paint: Type and color to match acoustic and grid units

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Section 01039 - Coordination and Meetings: Verification of existing conditions before starting work

- B. Verify that layout of hangers will not interfere with other work.
- C. Installer must examine the conditions under which the acoustical ceiling work is to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.
- D. Coordinate new Work with existing grid or hard ceilings that may remain.

3.02 INSTALLATION - LAY-IN GRID SUSPENSION SYSTEM:

- A. Install suspension system in accordance with ASTM C636 and manufacturer's instructions and as supplemented in this section.
- B. Install system in accordance with ASTM E580, capable of supporting imposed loads to a deflection of 1/360 maximum.
- C. **Locate system on room axis according to reflected plan. Notify Architect if room layout does not allow configurations suggested on the Reflected Ceiling Plan prior to grid installation.** Install after major above ceiling work is complete. Coordinate the location of hangers with other work. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid the use of less-than-half width units at borders, and comply with reflected ceiling plans and shop drawings wherever possible.
- D. If installing to a steel deck - provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members. Locate hangers near each end and spaced 4'-0" along each carrying channel or direct-hung runners, unless otherwise indicated. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws or other devices which are secure and appropriate for the substrate, and which will not deteriorate or fail with age or elevated temperatures
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner, or support components independently.
- H. Do not eccentrically load system, or produce rotation of runners.
- I. Perimeter Molding:
 - 1. Install edge molding at intersection of ceiling and vertical surfaces into bed of acoustic sealant.
 - 2. Use longest practical lengths.
 - 3. Overlap and rivet corners.
 - 4. Provide at junctions with other interruptions.
- J. Form expansion joints as detailed. Form to accommodate plus or minus 1-inch movement. Maintain visual closure.
- K. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with UL assembly requirements and light fixture ventilation requirements.

3.03 INSTALLATION - ACOUSTIC UNITS:

- A. Install acoustic units in accordance with manufacturer's instructions.
- B. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units one way with pattern parallel to longest room axis. Fit border trim neatly against abutting surfaces.
- D. Install units after above ceiling work is complete.
- E. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustic Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Cut edges to field cut units.

- 3. Double cut and field paint exposed edges of tegular units.
 - G. Lay acoustic insulation on either side of acoustic partitions as indicated.
 - H. Install hold-down clips to retain panels tight to grid system within 20 ft of an exterior door.
- 3.04 ERECTION TOLERANCES:
- A. Section 01400 - Quality Control: Tolerances
 - B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.
 - C. Install lay-in acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at penetrations, apply edge trim if edge not concealed by flanges of penetration.
 - D. Miter corners of moldings accurately to provide hairline joints, securely connected to prevent dislocation. At intersections with bullnosed wall corners, install cap with matching radius.
- 3.05 ADJUST AND CLEAN:
- A. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09510

SECTION 09650 - RESILIENT FLOORING**PART 1 - GENERAL**1.01 **RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to the work of this section.

1.02 **DESCRIPTION OF WORK:**

- A. Furnishing and installing all labor, materials and equipment necessary for a complete installation of each type of resilient flooring material and accessories as shown on the Drawings, Finish Schedules and/or specified herein. Resilient floor may be:
 - 1. Vinyl Composition Tile (VCT)
 - 2. Luxury Vinyl Tile (LVT) – tile or plank flooring
- B. Furnishing and installing vinyl base.

1.03 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 03300 - Concrete Work. All new slabs to receive resilient floor finish shall have a vapor barrier installed directly under the concrete.
- B. Section 12350 – Premanufactured Casework

1.04 **EXISTING CONDITIONS:**

- A. The Contractor and Installer for the work of this Section shall be responsible for becoming intimately familiar with existing conditions and substrates in areas to receive new resilient floor finishes.
- B. The Contractor and Installer for the work of this Section shall be responsible for making a thorough evaluation of worn and otherwise compromised substrates in order to implement proper stabilization and preparation measures, and to ensure sound a sound substrate, full bonding of new materials to existing and overall satisfactory installation of resilient flooring finishes.

1.05 **REFERENCED DOCUMENTS**

- A. ASTM International:
 - 1. F 2169 Standard Specification for Resilient Stair Treads
 - 2. E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
 - 3. E 648 Standard Test Method for Critical Radiant Flux of Flooring Systems Using a Radiant Energy Source
 - 4. E 662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 5. F 925 Standard Test Method for Resistance to Chemicals of Resilient Flooring.
 - 6. F 137 Standard Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus
 - 7. F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change
 - 8. F970 Standard Test Method for Static Load Limit.
 - 9. D2047 Standard Test Method for Static Coefficient of Friction as Measured by the James Machine.
 - 10. D 3389 Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform, Double-Head Abrader)
 - 11. F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - 12. F 1482 Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
 - 13. D 471 Standard Test Method for Rubber Property-Effect of Liquids
 - 14. F 386 Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
- B. Other Referenced Documents:

1. National Fire Protection Association (NFPA): NFPA 253, Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source.
2. National Fire Protection Association (NFPA): NFPA 255, Test Method for Surface Burning Characteristics of Building Materials
3. National Fire Protection Association (NFPA) 258 Test Method for Specific Density of smoke Generated by Solid Materials.

1.06 QUALITY ASSURANCE:

- A. All resilient flooring and finish materials shall contain no asbestos.
- B. Manufacturer: Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.
- C. Flooring Contractor Qualifications: Firm with not less than five (5) years of experience in projects comparable to work of this section.
- D. Flooring Installer Qualifications: Firm and crew with not less than five (5) years of experience in installation of flooring materials of type, quantity and installation methods comparable to work of this section.
 1. Installer firm and installation crew shall have documented experience with sheet vinyl integral or flash coving technique. Installer firm shall provide documentation of successful integral or flash coving work and project references at Architect's request.

1.07 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data for each type of resilient flooring and accessory.
 1. Submit material safety data sheets on all materials and guarantee in writing that all materials used to not contain asbestos.
- B. Submit 3 sets of samples of each type, color and pattern of resilient flooring and accessories required. Include full range of flooring color and pattern variation.
- C. Maintenance Data: Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

1.08 EXTRA STOCK:

- A. Deliver stock of maintenance material to Owner in quantity not less than one box for each 50 boxes or fraction thereof, for each type, color, pattern and size of tile installed. Maintenance materials to be from the same manufactured lot as materials installed, and enclosed in protective packaging with appropriate identifying label.

1.09 PROJECT CONDITIONS:

- A. Installation of resilient flooring should not begin until the work of all other trades has been completed, especially overhead trades. Areas to receive flooring shall be clean, fully enclosed and weathertight.
- B. Continuously heat areas to receive resilient flooring to a minimum of 68 degrees F. for at least 72 hours prior to installation. Room temperature will be maintained at a minimum of 68 degrees F. and a maximum of 100 degrees F. continuously during and after installation as recommended by flooring manufacturer, but for not less than 72 hours. Maintain minimum temperature as recommended by flooring manufacturer thereafter.
- C. Protect all materials from direct flow of heat from hot-air registers, radiators or other heating fixtures and appliances.
- D. Areas to receive flooring shall be adequately lighted to allow for proper inspection of the substrate, installation and seaming of the flooring for final inspection.

1.10 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials to job site in original unopened packaging with all labels intact.
- B. Store all rolled sheet materials vertically, labels up and ensure that the color, roll and batch numbers can be easily read.
- C. Boxed tile materials shall be stacked no more than five (5) boxes high.

- D. Store materials in a fully enclosed, weathertight area, and maintain at a uniform temperature of at least 68 degrees F. for 72 hours before, during and after installation.
- E. Sheet materials must always be stored and transported rolled face out on a heavy tube.

1.11 WARRANTY:

- A. Provide special product "installation" warranty signed by Contractor, installer and flooring manufacturer, agreeing to repair or replace defective materials and workmanship of all resilient flooring work during a 1-year warranty period following substantial completion. Attach copies of product warranties.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.
- B. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders.
- C. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.

2.02 VINYL COMPOSITION FLOOR TILE:

- A. Provide a Vinyl Composition Floor Tile (VCT): Products complying with ASTM F1066, Class 2, composed of polyvinyl chloride resin binder, plasticizers, fillers, and pigments with colors and texture dispersed uniformly throughout its thickness.
- B. Imperial Texture/Standard Excelon (Armstrong).
 - 1. Size: 12" x 12"
 - 2. Gauge: 1/8"
 - 3. Comply with the following Fire Test Data:
 - a. ASTM E 648 - Critical Radiant Flux: 0.45 watts/cm² or more, Class I
 - b. ASTM E 662 - Smoke Density: 450 or less.
 - d. ASTM F 970 - Static Load Limit: 75 psi.
- C. Acceptable Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Armstrong World Industries, Commercial Flooring.
 - 2. Johnsonite
 - 3. Mannington Flooring
 - 4. or Architect approved substitution.
- D. Colors: To be selected by Architect from manufacturer's full range. **Owner will seek to install VCT matching existing conditions in a number of locations.**

2.03 VINYL WALL BASE:

- A. Vinyl Wall Base: Products complying with Federal Specification SS-W-40a, Type II, Class 1, Styles B (cove). Provide matching end stops and preformed or molded corner units.
 - 1. Height: 4", see Finish Schedule for locations
 - 2. Thickness: 1/8" gauge
 - 3. Style: Standard bottom cove, unless otherwise indicated on Drawings
 - 4. Profile:
 - a. Standard smooth
 - 5. Finish: Matte.
 - 6. Fire Test Data:
 - a. ASTM E 648 - Critical Radiant Flux: 0.45 watts/cm² or more, Class I
 - b. ASTM E 662 - Smoke Density: 450 or less.
- B. Acceptable Manufacturer: Subject to compliance with requirements, provide products of one of the following:

1. Armstrong World Industries, Inc.
 2. Johnsonite, Division of Duramax, Inc.
 3. Roppe Corp.
 4. or Architect approved substitution.
- C. Colors: To be selected by Architect from manufacturer's full range.

2.04 ACCESSORIES:

- A. Resilient Transition Strips: Extruded or molded heavy-duty vinyl transition strips of size and profile appropriate for flooring type and installation conditions. Shall have a minimum of 2-inch wide anchorage flange.
1. Acceptable Manufacturers:
 - a. Armstrong
 - b. Roppe
 - c. or equal
 2. Colors: To be selected by Architect from manufacturer's full range.
- B. Concrete Slab Primer: Non-staining type only as recommended by flooring manufacturer for each type of flooring.
- C. Adhesives: For each type of resilient flooring material, installer must provide flooring manufacturer's recommended adhesive ONLY. No substitutions will be allowed.
- D. Patching/Leveling Compounds: As approved by each flooring manufacturer for each flooring type for each substrate type.
1. Calcium sulfate, plaster or gypsum patching/leveling compounds will not be accepted.
 2. Provide self-leveling epoxy patching compound for repair of worn terrazzo stair treads, or alternative patching material to achieve a level, smooth, hard and permanent patch.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Inspect all flooring materials under provisions of Division 1 to ensure they are free from defects that would preclude their use on this Project.
- B. Installer shall inspect subfloor/substrate surfaces to determine that they are satisfactory. A satisfactory subfloor is one that is smooth, rigid, cured, permanently dry, without surface blemishes and free from foreign matter. Foreign matter includes, but is not limited to, dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt, old adhesive residue and other substances preventing adhesive bond and impairing performance or appearance.
- C. Perform adhesive bond, moisture and pH tests on concrete subfloors prior to installation to determine if surfaces are sufficiently cured and dry as well as to ascertain the presence of curing compounds.
- D. Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory.
- E. Beginning of installation means Installer accepts existing surfaces and conditions.

3.02 PREPARATION

- A. Concrete Subfloors:
1. Use a portland cement patching/leveling compound with a liquid latex binder compatible with flooring adhesive to repair any cracks, holes, trowel marks or other substrate defects.
 - a. If patching/leveling compound is found not to be bonding tightly to the subfloor or if resilient flooring is found not to be bonding tightly to the patching/leveling compound during the guarantee period, the Contractor shall remove such loose patching/leveling compound and resilient flooring, and prepare the surfaces in whatever way necessary and reinstall patching/leveling compound and resilient flooring. Contractor shall guarantee such patched areas for a time period equal to original guarantee period. This work shall be done at no additional cost to the Owner.

2. Grind smooth and flush any ridges or high spots in concrete subfloors.
3. Remove any coatings or foreign substances from subfloor surfaces that would prevent adhesive bond and impair resilient flooring performance.
4. If subfloor surface is dusty or chalky, sweep the surface and seal with one coat of primer as recommended by the flooring and adhesive manufacturers.
5. Broom clean or vacuum surfaces to be covered and inspect subfloor.
- B. General provisions for preparing concrete subfloors apply to preparation of any subfloor.
- C. Where flooring/finish materials of different thicknesses meet in a seam (no transition trims), subfloor/substrate preparation shall include modifications to achieve a smooth and flush joint between dissimilar materials.
- D. Where installations are located over existing floor substrates, Installer shall evaluate and prepare substrates in strict accordance with resilient flooring manufacturer's recommendations. Resilient flooring Contractor shall be responsible for ensuring proper preparation and satisfactory installation of new flooring materials over existing subfloors and substrates.
- E. For areas to receive new resilient floor finishes and requiring new subfloor construction, the resilient flooring Contractor and Installer shall coordinate with the trades responsible for those subfloors to ensure that their work meets all flooring manufacturer's requirements.

3.03 INSTALLATION:

A. General:

1. Install resilient flooring and accessories in strict accordance with flooring manufacturer's recommendations for types of materials, project conditions and direct glue down installation. Installer shall confirm compatibility of all specified adhesives with flooring and base materials.
2. Butt tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions. Extend flooring into closets, toe spaces, door reveals and similar openings.
3. Tightly cement to subbase/subfloor without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Hand roll resilient flooring at perimeter of each covered area to assure adhesion.
4. Fit and apply all material in a neat and workmanlike manner, cut and scribed to adjoining work with joints as inconspicuous as practicable. Cut neat openings for items penetrating the flooring. Leave all surfaces smooth, straight and free from buckles and waves.
 - a. Broken, cracked, chipped, or deformed materials are not acceptable.
 - b. Place a bead of caulk tinted to match wall, along edges of flooring if no cove base is used. Caulk type and grade shall be appropriate for use at specific location. Bead shall be neat, continuous and unobtrusive.
5. Maintain reference markers, holes or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other non-permanent and non-injurious marking device.

B. Resilient Tile Installation:

1. Unless otherwise indicated, lay tile following chalk lines based on center marks established on principal walls, discounting minor offsets, so that tile at opposite edges of a room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeter. Lay tiles square to room axis, unless otherwise indicated on Drawings.
 - a. After adhesive is properly set, install the tile along chalk lines, laying field tile first and then fitting in border tile.
 - b. Lay tile in "checkerboard" fashion with grain reversed in adjacent tiles, unless otherwise indicated.
2. When using tile from two or more cartons, check to be sure all pattern and lot numbers are the same to ensure proper color match.
3. Remove adhesive on the face of tiles using methods recommended by the adhesive and flooring manufacturers.

C. Vinyl Base:

1. Apply wall base to all walls, curbs and built-in fixtures around columns, pilasters and piers, and into all recesses and returns of the rooms or parts in which it occurs, unless otherwise shown. Tightly bond base to substrate over full length of each piece.
 2. Install base in lengths as long as practicable. Neatly form base to follow all curved surfaces and shapes of the finished wall or other construction. Install preformed one-piece exterior corners at all exterior corners. Miter or cope interior corners if preformed pieces are not available.
 3. On masonry surfaces or other similar irregular substrates, fill voids along top edge of wall base with manufacturer's recommended adhesive filler material.
 4. Verify that gypsum board and plaster walls have been finished to within 1/4" of the floor and that a smooth surface is provided for application of wall base.
- D. Accessories:
1. Install edge strips at all locations indicated in the Drawings and Schedules, or if not indicated, at all doorways and locations where a change in flooring type occurs. Butt tight to flooring and secure with adhesive. Provide at all exposed edges of flooring.
- 3.04 CLEAN-UP -- GENERAL:
- A. Upon completion of the installation, the Installer shall remove all waste and excess material, all tools and equipment and shall carefully and thoroughly sweep the entire floor surface with a dust mop to the Owner's satisfaction.
 - B. All usable pieces of tile not necessary to complete the work shall be left on the job site in an orderly manner in an area designated by the Owner.
- 3.05 CLEANING AND PROTECTION:
- A. Immediately upon completion of resilient flooring installation clean flooring in strict accordance with manufacturer's recommendations.
 1. Do not wash floor until time period recommended by resilient flooring manufacturer has elapsed to allow resilient flooring to become well sealed in adhesive.
 2. Remove all excess adhesive or other surface blemishes, using neutral type cleaners as recommended by flooring manufacturer. Cover to protect installed flooring from damage.
 - B. Protect flooring against damage during construction period and comply with resilient flooring manufacturer's directions.
 1. After cleaning, apply protective polish or other coating as recommended by flooring manufacturer for each type of flooring.
 2. Protect resilient flooring against damage from rolling loads for initial period following installation by covering with plywood or hardboard. Use dollies to move stationary equipment or furnishings across floors.
 3. Cover resilient flooring with undyed, untreated building paper until inspection for substantial completion.
 - C. Clean resilient flooring not more than four (4) days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project using flooring manufacturer's recommended method for each type of flooring.
 1. Strip protective floor polish (applied immediately after installation) prior to cleaning; work in strict compliance with flooring manufacturer's instructions for each type of flooring
 2. **Reapply sealer or coating and machine buff - with type of sealer, polish or coating, number of coats and buffing procedures in strict compliance with flooring manufacturer's instructions for each type of flooring.**
- 3.06 REPLACEMENT OF IMPROPER WORK:
- A. Readjust and/or replace any and all improper work and materials within twelve (12) months after final acceptance and project sign off at no additional cost to the Owner.

END OF SECTION 09650

SECTION 09900 - PAINTING**PART 1 - GENERAL****1.01 WORK INCLUDED:**

- A. General: The terms "**finishing**", "**paint**" or "**painting**" as used in the Drawings and this Section are general terms which shall include surface preparations required for the application of all finishes noted herein, and the installation/application of fillers, sealers, primers, stains, paints, varnishes and/or other surface materials.
- B. Preparation of all surfaces and materials to receive finish.
- C. Painting of all surfaces indicated on the Room Finish Schedule, Door Schedule and/or as noted on the Documents.
- D. All interior and exterior exposed and/or unfinished items (not pre-finished by the manufacturer) and surfaces throughout the project, including, but not limited to the following:
 - 1. All gypsum board surfaces - typical
 - 2. All frames and doors - typical
 - 3. Finishing of all exposed woodwork
 - 4. Painting of all unfinished (i.e. no factory final finish) interior and exterior metal, including:
 - a. All mechanical panels, access panels, cover plates, louvers, grilles, and metal expansion plates not factory-finished.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 08712 – Door Hardware
- B. Section 09215 – Veneer Plaster
- C. Section 09250 - Gypsum Drywall Systems

1.03 COLOR SCHEDULES AND SAMPLE FINISHES:

- A. See Color Coordination, below.
- B. After the beginning of construction (see 'Color Coordination' paragraph, below), the architect will prepare a color schedule for color and finish requirements for each painted or finished surface for this project. **The schedule may include color chips for matching.**
- C. Notify the Architect prior to mobilizing for painting so samples of colors and/or finishes may be requested.
- D. When requested by the architect, before paint materials are delivered to the jobsite, furnish 12" x 12" samples of colors and/or **finishes** applied on materials similar to those to which paint will be applied on the project. After 12"x12" samples have been approved by the Architect/Owner and -
- E. The Architect has the option of accenting certain building elements different colors. This information will be included in the final Color Schedule.
- F. Tinted primer shall be used whenever deep tone colors are specified.

1.04 ATTIC STOCK:

- A. Leave on premises, one unopened gallon of each color of each type of paint or finish used.
- B. Containers to be unopened after preparation at the factory, tightly sealed, bearing manufacturer's name, type of paint, brand name, color designation, and instructions for mixing and/or reducing.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver paint materials in sealed original labeled containers, bearing manufacturer's name, type of paint, brand name, color designation and instructions for mixing and/or reducing.
- B. Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 45 degrees F. in a well-ventilated area.
- C. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.06 SUBMITTALS:

- A. Within thirty (30) days after an award of bid, the painting contractor shall submit a statement to the architect indicating both the manufacturer of paint of finish products to be used on the job, and the specific brand name for each usage specified.
 - B. The painting contractor shall provide the architect with (2) complete and current color decks from the select manufacturer to select colors from. One color deck will be retained by the Architect.
- 1.07 COLOR COORDINATION:
- A. After receipt of all project submittals containing color selection criteria, the architect shall prepare an overall color presentation to the Owner, for approval.**
 - B. The overall color presentation to the Owner will not be scheduled until all submittals containing color selection criteria have been approved by the Contractor and delivered to the architect for review.**
- 1.08 MANUFACTURER CERTIFICATION:
- A. Manufacturer shall certify that tests have been performed on semi-gloss wall finish and others selected by Architect. Testing shall include the following (or equivalent) tests:
 - 1. Scrub resistance ASTM D2486-79: Value as specified in approved schedule, but not less than 1,200.
 - 2. Washability ASTM D3450-80: Value as specified in approved schedule but not less than 80% for sponge and 90% for brush.
- 1.09 MIXING, THINNING, AND STORAGE:
- A. Store and mix paints only in areas designated and provided with proper protection for floors and walls.
 - B. Mix and thin paints in strict accordance with Manufacturer's recommendations.
 - C. Deliver and store paints and related flammable materials in the Manufacturer's original unopened containers, as far as practicable. Keep partially used materials in tightly closed containers.
 - D. Do not store oil or paint soaked rags inside the building. Do not store materials in any room containing a direct fired heating unit.
- 1.10 ENVIRONMENTAL CONDITIONS:
- A. A minimum interior temperature of 65 degree F shall be maintained during the actual application and drying of the paint and until occupancy of the building occurs. Adequate ventilation shall be maintained at all times to control excessive humidity that will adversely affect the curing of coatings. The general contractor is solely responsible for maintaining suitable temperatures and ventilation.
 - B. No exterior painting shall be undertaken if air or surface temperatures are below 50 degree F, or if the temperature is expected to drop below that mark before the coating has dried. Do not paint during or immediately after foggy, rainy, or frosty weather, or until frost, dew or condensation has evaporated. Ambient air temperature and surface temperature must be minimum 5 degree F above dew point.
 - C. Surfaces shall be dry before any coating is applied. New plaster, masonry and concrete work shall not be primed until it has been determined these substrates have dried sufficiently and are of suitable Ph to safely accept paint. A reliable electronic moisture meter shall be used to make the determination pertaining to moisture.
 - D. Adequate lighting shall be provided in work areas to assure adequate illumination. See Division 1, for temporary electric requirements.
 - E. Do not commence work in spaces until all other trades other than finish work trades have completed their work within the space.
- 1.11 PROTECTION:
- A. Close off the various spaces while painting and exclude dust until finish is dry.
 - B. Adequately protect adjacent surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.

- C. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted and in particular, surfaces within storage and preparation area.
- D. Remove electrical plates, surface hardware, fittings and fastenings, prior to painting operations. These items are to be carefully stored, cleaned and replaced on completion of work in each area. When cleaning hardware, do not use solvent that may remove permanent lacquer finish.

1.12 QUALITY ASSURANCE:

- A. General: Work shall be performed by tradesmen with at least (5) five years experience with similar types of preparation and application as required by this Project.
- B. Refinishing and/or refurbishing woodwork: Work shall be performed by tradesmen with at least (5) five years experience, and who are capable of evaluating wood surfaces, stripping, fine sanding, and refinishing hardwood and softwood surfaces.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. All **paint** (opaque coatings) materials shall be products of:
 - 1. Benjamin Moore
 - 2. Sherwin-Williams
 - 3. Pratt & Lambert
 - 4. Devoe Paint
 - 5. Pittsburgh Paint Company
 - 6. Substitutions shall not be made without the architect's prior approval.
- B. All **stains** (pigmented coatings) materials shall be products of:
 - 1. Flood Products
 - 2. Valspar Co. - Cabot stains
 - 3. PPG Architectural Finishes – Olympic stains
 - 4. Sherwin-Williams
 - 5. Wolman Wood Care Products
 - 6. Minwax Co.
 - 7. Old Masters Craftsman Stains
 - 8. or approved equal
- C. All **sealers/transparent top-coats** (translucent coatings) shall be products of:
 - 1. Flood Products
 - 2. Valspar Co. - Cabot stains
 - 3. Sherwin-Williams
 - 4. Wolman Wood Care Products
 - 5. or approved equal
- D. All materials used on the job shall be the manufacturer's highest quality product for each usage specified. **The contractor shall provide the most current product for the application noted, and/or the product replacement when products noted have been discontinued.**

2.02 MATERIAL COORDINATION:

- A. Furnish specified Manufacturer's top quality, first line material, delivered to the job-site in original, unopened, labeled containers.
- B. Acceptance of materials is conditional upon demonstration of washability and abrasion resistance of specified test patch.
- C. Tinted primer shall be used whenever deep tone colors are specified.
- D. All primers/first-coats shall be compatible with final top-coats.
 - 1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

2.03 PRODUCTS:

A. The following requirements are for material and specific applications noted below. **Should one or more of the specified products no longer be produced by the manufacturer (due to a change in product line, for example), the Contractor shall use another similar product from the same manufacturer(s) providing the product and warrant is substantively similar to the specified product and intended for the application noted.**

B. Exterior Finishes:

1. Painted Wood/Composite Siding:
 - a. First Coat:
 - 1) Benjamin Moore Moorcraft Latex Exterior Primer 169r
 - 2) Pittsburgh Paints 6-609 Speedhide Exterior Latex Primer
 - 3) Pratt & Lambert Latex Suprime 2
 - 4) Sherwin-Williams - Exterior Latex Wood Primer B42w8041
 - b. Second and Third Coats – as specified:
 - 1) Benjamin Moore Moorcraft Latex House and Trim Paint 170
 - 2) Pittsburgh Paints 6-2000 Series, Speedhide Exterior Satin Latex
 - 3) Pratt & Lambert Pro Hide + Satin Latex H.P.
 - 4) Sherwin-Williams A-100 Exterior Latex Satin A82 Series.
2. Asphalt Pavement Markings:
 - a. Refer to Division 2.

C. Interior Finishes:

1. Gypsum Board Ceilings and/or Soffits:
 - a. First Coat:
 - 1) Benjamin Moore Moorcraft Vinyl Latex Primer-Sealer 273
 - 2) Pittsburgh Paints 6-603 Speedhide Acrylic Alkali Resistant Primer for plaster; 6-2 Speedhide Latex Primer-Sealer for gypsum board
 - 3) Pratt & Lambert Pro-Hide + PVA Wall Primer Z-96
 - 4) Sherwin-Williams ProMar 200 Zero VOC Primer B28W2600
 - b. Second and Third Coat:
 - 1) Sherwin-Williams ProMar 200 Zero VOC Flat B30 Series
 - 2) Or equal
2. Plaster and/or Gypsum Board Walls:
 - a. First Coat:
 - 1) Benjamin Moore Moorcraft Vinyl Latex Primer-Sealer 273
 - 2) Pittsburgh Paints 6-603 Speedhide Acrylic Alkali Resistant Primer for plaster; 6-2 Speedhide Latex Primer-Sealer for gypsum board
 - 3) Pratt & Lambert Pro-Hide + PVA Wall Primer Z-96
 - 4) Sherwin-Williams ProMar 200 Zero VOC Primer B28W2600
 - b. Second & Third Coats:
 - 1) BENJAMIN MOORE® Aura Waterborne Interior Paint – Satin Finish 526
 - 2) Graham Aqua Borne Ceramic interior **flat** wall paint – when flat required.
 - 3) Sherwin-Williams Duration interior acrylic latex – 1200 series
 - 4) Sherwin-Williams Purpose Latex Primer B51-450 Series
3. Ferrous, Galvanized Steel, and Aluminum Metals:
 - a. Prepare ferrous and galvanized metals as herein before specified. See Division 5 for requirements of priming of ferrous metals. Do all touch up and priming on unprimed metals in accordance with requirements of Division 5.
 - b. Apply paint in accordance with Steel Structure Painting Council Paint Application Specifications SSPC-PA1 to a dry film thickness as specified by the manufacturer.
 - c. First Coat (primer) at ferrous metals (to be used even at shop primed items except as noted in Division 5):
 - 1) Benjamin Moore MO4 Acrylic Metal Primer
 - 2) Pittsburgh Paints 90-708 Series Pitt-Tech One-Pack Interior/Exterior Industrial Primer
 - 3) Pratt & Lambert Latex Suprime 3
 - 4) Sherwin-Williams ProCryl Universal Primer B66-310

- d. First Coat (primer) at galvanized metals (after thorough cleaning with minerals spirits, changing rags frequently – SSPC-SP1 with VM&P Naptha)
 - 1) Benjamin Moore MO4 Acrylic Metal Primer
 - 2) Pittsburgh Paints 90-708 Series Pitt-Tech One-Pack Interior/Exterior Industrial Primer
 - 3) Pratt & Lambert Latex Suprime 3
 - 4) Sherwin-Williams ProCryl Universal Primer B66-310
- e. First Coat (primer) at aluminum:
 - 1) Benjamin Moore MO4 Acrylic Metal Primer
 - 2) Pittsburgh Paints 90-708 Series Pitt-Tech One-Pack Interior/Exterior Industrial Primer
 - 3) Pratt & Lambert Latex Suprime 3
 - 4) Sherwin-Williams ProCryl Universal Primer B66-310
- f. Second and Third Coats (Ferrous, Galvanized Metals, and Aluminum):
 - 1) Benjamin Moore Moorcraft Latex Semi Gloss Enamel 276
 - 2) Pittsburgh Paints 6-512 Speedhide Semi Gloss Latex Enamel
 - 3) Pratt & Lambert Pro-Hide + Latex Satin Enamel
 - 4) Sherwin-Williams Metalatex Semi Gloss Enamel B-42 Series
- 4. Painted Woodwork including any interior window sash and trim: Coordinate with Division 6 to verify scope of work to be finished by Millwork Contractor.
 - b. First Coat:
 - 1) Benjamin Moore Moorcraft Alkyd Enamel Underbody 269
 - 2) Pittsburgh Paints 6-6 Speedhide Alkyd Enamel Undercoater
 - 3) Pratt & Lambert Alkyd Suprime 11
 - 4) Sherwin-Williams Premium Wood and Wall Primer, B28W8111
 - c. Second and Third Coats:
 - 1) Benjamin Moore Dulamel Alkyd Eggshell Enamel 305
 - 2) Pittsburgh Paints 6-90 Series Speedhide Lo-Sheen Alkyd Enamel (for deep tone colors use 20-554)
 - 3) Pratt & Lambert Pro-Hide + Alkyd Eggshell Enamel
 - 4) Sherwin-Williams ProMar 200 Acrylic Alkyd Eg-Shel B33W8251 Series
- D. Mechanical** (unless otherwise specified in Division 15):
 - 1. Grilles, Registers, and Diffusers:
 - a. First Coat:
 - 1) Benjamin Moore MO4 Acrylic Metal Primer
 - 2) Pittsburgh Paints 90-708 Series Pitt-Tech One-Pack Interior/Exterior Industrial Primer
 - 3) Pratt & Lambert Latex Suprime 3
 - 4) Sherwin-Williams ProCryl Universal Primer B66-310
 - b. Second and Third Coats:
 - 1) Benjamin Moore Moorcraft Latex Semi Gloss Enamel 276
 - 2) Pittsburgh Paints 90-474 Series Pitt-Tech One-Pack Interior/Exterior Satin High Performance Industrial Enamel
 - 3) Pratt & Lambert Pro-Hide + Latex Satin Enamel
 - 4) Sherwin-Williams Metalatex Semi Gloss Enamel B-42 Series
- E. Electrical** (unless otherwise specified in Division 16):
 - 1. Exterior Exposed Electrical Conduit, Fittings, Boxes, and Other Miscellaneous Exterior Electrical Items:
 - a. First Coat at Galvanized Materials:
 - 1) Benjamin Moore MO4 Acrylic Metal Primer
 - 2) Pittsburgh Paints 90-708 Series Pitt-Tech One-Pack Interior/Exterior Industrial Primer
 - 3) Pratt & Lambert Latex Suprime 3
 - 4) Sherwin-Williams ProCryl Universal Primer B66-310
 - b. First Coat at Ferrous Metal Materials:
 - 1) Benjamin Moore MO4 Acrylic Metal Primer

- 2) Pittsburgh Paints 90-708 Series Pitt-Tech One-Pack Interior/Exterior Industrial Primer
- 3) Pratt & Lambert Latex Suprime 3
- 4) Sherwin-Williams ProCryl Universal Primer B66-310
- c. Second Coat:
 - 1) Benjamin Moore Impervex Enamel 309
 - 2) Pittsburgh Paints 90-374 Series Pitt-Tech One-Pack Interior/Exterior Gloss High Performance Industrial Enamel
 - 3) Pratt & Lambert Latex Accolade Exterior Glass 24300
 - 4) Sherwin-Williams DTM Acrylic Gloss Coating (Water Reducible) B66 Series
2. Interior Exposed Electrical Items in areas where walls and/or ceilings are painted including electrical panels, cabinets, exposed conduit, etc:
 - a. First Coat at Galvanized Materials:
 - 1) Benjamin Moore MO4 Acrylic Metal Primer
 - 2) Pittsburgh Paints 90-708 Series Pitt-Tech One-Pack Interior/Exterior Industrial Primer
 - 3) Pratt & Lambert Latex Suprime 3
 - 4) Sherwin-Williams ProCryl Universal Primer B66-310
 - b. First Coat at Ferrous Metal Materials:
 - 1) Benjamin Moore MO4 Acrylic Metal Primer
 - 2) Pittsburgh Paints 90-708 Series Pitt-Tech One-Pack Interior/Exterior Industrial Primer
 - 3) Pratt & Lambert Latex Suprime 3
 - 4) Sherwin-Williams ProCryl Universal Primer B66-310
 - c. Second Coat:
 - 1) Benjamin Moore Moorcraft Latex Semi Gloss Enamel 276
 - 2) Pittsburgh Paints 90-474 Series Pitt-Tech One-Pack Interior/Exterior Satin High Performance Industrial Enamel
 - 3) Pratt & Lambert Pro-Hide + Latex Satin Enamel
 - 4) Sherwin-Williams Metalatex Semi Gloss Enamel B-42 Series

PART 3 - EXECUTION

3.01 GENERAL:

- A. The painting contractor shall be wholly responsible for the quality of the work and is not to commence any part of it until each surface is in proper condition. All surfaces are to be clean. If for any reason the surface cannot be cleaned, this condition shall be promptly reported to the General Contractor and the Architect prior to commencing with the work.
 1. Surfaces shall be properly prepared, dry, and free of any foreign materials such as dirt, dust, oil, grease, rust, scale, mildew, algae, mold, effervescence, release agents, etc., which will adversely affect adhesion or appearance of applied coating.
- B. Examine each surface scheduled to be painted or finished prior to commencing with the work. Report any condition that may potentially affect proper application. **Application of first coat constitutes acceptance of surface as being in fit condition to receive paint.**
- C. To prevent contamination of the substrate, apply the prime coat to each surface as soon as possible after surface preparation has been completed.
- D. Test shop applied primer for compatibility with subsequent cover materials. Report adverse conditions, if any, to the Architect prior to continuing with the work.
- E. The Architect may take samples of materials used on the project for testing purposes. Shall samples not match manufacturer's product specifications, no credit will be given for work covered with the questionable material and any cost of test shall be borne by the painting contractor.
- F. Test moisture content of each surface using a properly calibrated electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 1. Plaster and Gypsum Wallboard: 12 percent.

2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 3. Interior Wood: 15 percent, measured in accordance with ASTM D2016.
 4. Exterior Wood: 15 percent, measured in accordance with ASTM D2016.
 5. Concrete Floors: 8 percent.
- G. Do not apply paints when the temperature of or on the substrate or the temperature of the air in the vicinity of the painting work is below 45 degrees or above 95 degrees Fahrenheit. Application shall proceed only when relative humidity is between 20 and 80 percent. Exterior and interior latex paints shall not be applied below 50 degrees Fahrenheit unless so authorized in writing by the manufacturer. Epoxy paints and other sophisticated coating shall not be applied below 50 degrees Fahrenheit unless otherwise noted on the manufacturer's printed instructions.
- H. Test Ph of plaster, masonry, and concrete surfaces. Neutralize where required.
- I. Remove electrical plates, hardware, light fixture trim, escutcheons, and other miscellaneous fittings prior to preparing surfaces for painting or finishing. Masking will not be accepted.
- J. Correct surface defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.
- K. Seal all marks that may bleed through surface finishes with appropriate stain-stopping coating.
- L. Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry. Follow manufacturer's recommendations for final preparation.

3.02 PREPARATION OF VARIOUS NEW SURFACES (NOT PREVIOUSLY FINISHED):

- A. For all surfaces and conditions:
1. Remove all cover plates, hardware and fixtures prior finishing
 2. Clean all substrates of nubs, dust and oils that could affect finish
 3. Refer to Section 09250 for additional information as to the requirements of gypsum board surface prep prior to finishing.
- B. New interior wood - opaque:
1. Sand all imperfections from the wood to receive a clear or transparent finish.
 2. All surfaces must be free of sanding dust, and shall be thoroughly dry.
 3. Staining and sealing preparation:
 - a. Apply the stain/sealer according to manufacturer's instructions. Coordinate with the Architect for exact color or density of stain application with appropriate samples.
 - b. Finish with finish coat(s) as required by the Documents.
 4. Opaque finish preparation:
 - a. Spot prime defects if the final coating is opaque.
 - b. Apply a primer coat to all surfaces.
 - c. Apply finish coat(s) as directed by these Documents or Schedules.
 - d. Sand between coats if directed.
- C. New exterior wood or composite siding:
1. Scrape any sap drippings from (exterior) wood.
 2. Sand or otherwise remove any trade stamps, burn labels or other markings from the wood to receive a clear or transparent finish.
 3. All surfaces must be free of sanding dust, and shall be thoroughly dry.
 4. Staining and sealing preparation:
 - a. Apply a "mill finish remover" to allow the wood to receive the finish coat.
 - b. Let the wood completely dry prior to any final finishing.
 - c. Apply the stain/sealer according to manufacturer's instructions. Coordinate with the Architect for exact color or density of stain application with appropriate samples.
 - d. Finish with finish coat(s) as required by the Documents.
 5. Opaque finish preparation:
 - a. Spot prime defects, knots or sap wells if the final coating is opaque.
 - b. Apply a primer coat to all surfaces. **Siding or other woods forming an exterior surface exposed to the weather shall be thoroughly back-primed prior to initial installation.**

- c. Apply finish coat(s) as directed by these Documents or Schedules.
- d. Sand between coats if directed.
6. Priming and backpainting of wood:
 - a. All wood which is to be painted, factory finished or otherwise, must be backprimed immediately upon delivery with an appropriate primer specified for wood; or with manufacturer's recommended protective pre-treatment for wood which is to have a natural finish.
 - b. Apply first coat to all wood scheduled to receive natural finish as soon as possible.
 - c. Furnish sealer to other trades for touching up any bare wood caused by mortising or butting of surfaces, or any kind of assembly or installation.
 - d. Avoid painting or otherwise staining edges of wood where natural finish is scheduled.
- D. New Gypsum Board and Plaster:
 1. Fill minor defects with filler compound. Spot-prime and patched defects after repair.
 2. All surfaces must be free of sanding dust, and joint treatment shall be thoroughly dry.
 3. **Verify condition of gypsum board surfaces prior to finishing – Refer to USG standards:**
 - a. **Level 4 Drywall Finish for typical paints: All joints and interior angles shall have tape embedded in joint compound and at least two separate coats of joint compound applied over all joints, angles, fastener heads, and accessories. The surface shall be smooth and free of tool marks and ridges.**
 - b. If gypsum wallboard surfaces have not been finished to Level required above, notify the Architect prior to commencing with work.
 - c. **For all areas of new gypsum board in-fills in areas of existing construction: apply joint compound or Imperial Coat plaster as needed to create a smooth, invisible transition between new and existing construction.**
- E. Doors – metal and wood:
 1. Sand all edges of wood door smooth. Remove any burrs or welding droppings from metal door panels prior to finishing.
 2. Finish all edges, including tops and bottoms of wood and metal doors same as faces.
 3. Seal top and bottom edges with two coats of zinc-rich primer for all metal doors scheduled to be painted.
- F. Galvanized Metal Surfaces:
 1. Aggressively clean surface with mineral spirits. Remove surface contamination and oils and wash with solvent.
 2. Abraded areas that have begun to rust shall be immediately sanded clean and spot primed with a rust inhibiting primer.
 3. Prime with specified primer.
- G. Metals, Structural or Plate Steel:
 1. Clean all surfaces of residual deposits of grease and oil.
 2. Clean in accordance with SSPC-SP1-63 "Solvent Cleaning".
 3. Surfaces that exhibit rust formation, mill scale, etc., must be cleaned in accordance with SSPC-SP2-63 or SSPC-SP3-63. Particular care is to be exercised to remove welding flux, slag, and fume deposits. Weld spatters and burrs must be removed.
 4. Primer coats shall be applied without delay, before rust reappears.
- H. Uncoated Steel and Iron Surfaces:
 1. Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned.
 2. Spot prime paint after repairs.
 3. Apply bituminous coating to all steel which is not exposed to view and will be in contact with concrete or masonry.
- I. Shop Primed Steel Surfaces:
 1. Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous.
 2. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.

3. All shall receive a zinc-rich primer compatible with final finish coatings.

3.03 PREPARATION OF SURFACES (PREVIOUSLY PAINTED or EXISTING)

A. **Comply with requirements as specified for preparation of new construction surfaces as well as the following:**

1. Scrub clean existing surfaces with a stiff brush and a solution of clean water and mild detergent.
2. Scuff –sand surface to allow new finish to hold.
3. De-gloss painted surfaces in a manner appropriate to the substrate.
4. Fill cracks, holes, voids, and defects, and leave a smooth surface ready for application of primer.
5. Remove loose paint and feather edges or patch as required to provide a smooth, seamless finish.
6. **Verify with manufacturer of new finish and prime existing surfaces as required for complete adhesion between existing surfaces and new finishes.**
7. Prepare a 36" x 36" minimum test area to see if a reaction occurs between existing and new finishes prior to proceeding with the specified work. If a reaction occurs, alert the Architect with a proposed solution prior to proceeding with work.

B. Existing Plaster:

1. Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
2. Precautions shall be taken when patching cracks in old plaster that has been painted. The texture of the patch shall match the adjacent surface to prevent a darker or lighter color from appearing in the finished coat. If the adjacent surface is smooth, sand the patch to a comparable smoothness. If the wall is textured, roughen the surface to approximate the previously painted appearance.
3. Feather all edges of the patch to blend in with the surrounding surfaces. Be sure the patched area is thoroughly dry.
4. Spot prime with an alkali-resistant primer, or as recommended by paint manufacturer. Before painting the entire wall, the patched areas shall be spot-coated over the primer, using the same paint as finish coat. This will enable the patch to give better "hold-out" and provide a uniform appearance to the top coat.
5. Because of porosity in many painted surfaces previously finished with a flat paint, as many as two coats of oil-type primer-sealer may be required to seal the old finish sufficiently to provide proper "hold-out" if the finish is of a higher gloss.

C. Existing Plaster, Water-damaged

1. Preparation: Sand and Clean, feather edges - typical.
2. Use hand-held tools to remove all loose paint and other contaminants from the surface. Repair the surface by filling crack, holes, etc. with an appropriate material. Remove surface projections. Ensure that the surface is clean, free of oil or grease, and dry before applying any paint.
3. Remove all dirt, oil, and grease by WASHING WITH A SUITABLE CLEANING SOLUTION. Thoroughly rinse the surface after cleaning. Allow the surface to dry before any sanding and dusting.
4. Use sandpaper or other abrasive to remove surface projections and produce a surface that is smooth and uniform enough to receive the coating. Either hand or power tool methods can be employed. Start by using a coarse abrasive; continue with progressively finer grades until the desired surface smoothness is attained. **Higher gloss coating systems require smoother surfaces.**
5. All sanding, dust, or other debris from the sanding process must be removed from the surface using a tack cloth, broom, or vacuum. Failure to remove all contaminants will give the surface a rough finish as well as promote early coating failure.
 - a. Use hand-held tools to remove all loose paint and other contaminants from the surface. Repair the surface by filling crack, holes, etc. with an appropriate material. Remove surface projections. Ensure that the surface is clean, free of oil or grease, and dry before applying any paint.

3.04 CLEANING AND PAINTING OF EXISTING WOODWORK

- A. Wood to be Painted
1. Clean wood surfaces of dirt, oil, or other foreign substances with scrapers, mineral spirits and sandpaper. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried. Sand exposed surfaces smooth and dust off.
 2. Scrape and clean knots and apply a thin coat of knot sealer to knots, pitch streaks, and sappy spots before application of priming coat.
 3. After priming, fill holes and imperfections with putty or plastic wood filler.
 4. After fitting by carpenter, prime top and bottom of doors the same as the face of the door.

3.05 APPLICATION AND FINISHING REQUIREMENTS

- A. All specified products shall be applied at the minimum wet film thickness rate as recommended by the manufacturer.
- B. The number of coats scheduled are minimums. Provide paint finishes free from cloudy or mottled surfaces and with complete coverage of even, uniform color. Spot prime or undercoat as necessary for complete coverage.
- C. Apply paints and finishes in the order scheduled, unless otherwise directed. Where more than one coat of paint is scheduled, tint undercoats to approximately the same color as the finish coat, but vary the shade of succeeding coats for identification.
- D. Do not apply succeeding coats until undercoats are thoroughly dry.
- E. After completion of work, do all necessary touching up of all the Painting and Finishing and leave the work in perfect condition.
- F. Additional coats will be required where finished work is not in complete compliance with all requirements of these specifications, or if complete coverage is not accomplished in the specified number of coats.
- G. All coats specified under this division are in addition to shop priming coats specified under other divisions. A completely finished job is required, regardless of whether every individual item is mentioned herein or not.
- H. All painting materials and installation procedures shall comply with all Federal Regulations.
- I. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the owner.

3.06 WORKMANSHIP

- A. All painting and finishing work shall be done by thoroughly experienced, skilled, competent mechanics and smoothly flowed on without runs, sags, streaks, wrinkles, shiners, or bush marks. Apply proprietary paint products in strict accordance with manufacturer's instructions.
- B. Except where specifically authorized by the Architect, apply flat or eggshell wall paint by brush or roller; apply gloss or semi-gloss with brush only.**
- C. Sanding: In addition to preparatory sanding, fins sand between succeeding coats of all varnish enamel or flat enamel, using sandpaper appropriate to the finish. Use fine production paper between coats.
- D. Painting Contrasting Colors: Cut to meet true lines against contrasting colors. Holidays and restrikes in painted surfaces shall be considered sufficient cause to require recoating of entire surface.
- E. Execute all painting and finishing work strictly as per approved color and finish samples. Commencing work before obtaining said approvals is at the contractor's risk.
- F. Comply with manufacturer's printed directions on labels of all product containers. Primer and finish coats shall be products of the same manufacturer.
- G. All suction spots or "hot spots" in plaster and/or cement after the application of the first coat shall be touched up before applying the second coat.
- H. Remove electrical panel box covers and doors before painting walls. Paint separately and reinstall after all paint is dry. Remove all finish hardware from walls, doors and cabinets before painting.

- I. **Enamel finish applied to metal shall be sanded with fine sandpaper and then cleaned between coats to produce an even surface. All undercoats of paint or enamel to be off shade from other coats such that one coat can be clearly identified from the next.**
- J. Do all necessary puttying of nail holes, cracks and similar conditions, after first coat, with putty of color matching finish. Bring putty flush with adjoining surfaces.
- K. The architect reserves the right to inspect each coat of paint or other finish before application of succeeding coat or else no credit for said coat will be given and the painting contractor automatically assumes responsibility for recoating work in question. Notify architect when each coat is ready for inspection.
- L. Paint all walls and/or framing members behind grilles and at reveals, which will be visible from occupied areas. Paint shall be flat black.
- M. Replace hardware after completion as originally installed.

3.07 CLEANING:

- A. At conclusion of work and/or when directed, examine all painting and finishing work. Clean paint spots off glass, plaster, metal, fabric wall coverings, wood and other surfaces. Clean and repair paint finish where dark spots, fingerprints, and similar imperfections appear. Said retouching shall exactly match surrounding surfaces. Refinish entire surface in question in order to attain this result if necessary. Leave all painting and finishing in perfect condition.
- B. During progress of the work keep premises free from accumulations of tools, equipment, surplus materials and debris. At completion of work leave premises neat and clean.

3.08 SCHEDULE - EXTERIOR SURFACES

- A. Wood - Opaque:
 - 1. One coat of primer sealer
 - 2. Two coats of exterior paint
- B. Steel - Galvanized:
 - 1. One coat primer for galvanizing
 - 2. Two coats of semi-gloss paint

3.09 SCHEDULE - INTERIOR SURFACES

- A. Wood - Painted:
 - 1. One coat of latex prime sealer
 - 2. Two coats of latex enamel, semi-gloss paint
- B. Plaster and Gypsum Board wall surfaces:
 - 1. One coat of latex-based PVC primer sealer
 - 2. Sealer shall be tinted for all dark colors.
 - 3. Two coats of latex eggshell/satin paint
- C. Plaster and Gypsum Board ceiling/soffit surfaces:
 - 1. One coat of latex-based PVC primer sealer
 - 2. Two coats of latex flat paint

END OF SECTION 09900

SECTION 10441 - PLASTIC SIGNS**PART 1 - GENERAL**

- 1.01 **SECTION INCLUDES:**
A. Interior engraved plastic signs.
- 1.02 **RELATED SECTIONS:**
A. Division 15 - Mechanical Identification.
B. Division 16 - Electrical Identification.
- 1.04 **REFERENCES:**
A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable By Physically Handicapped People.
B. ASTM E84 - Surface Burnings Characteristics of Building Materials.
- 1.05 **SUBMITTALS:**
A. Submit under provisions of Section 01300.
B. Shop Drawings: Coordinate with the existing Huron High signage for compatibility. Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.
C. Samples: Submit two sample signs, illustrating type, style, letter font, and colors specified; method of attachment.
D. Manufacturer's Installation Instructions: Include installation template and attachment devices.
- 1.06 **QUALIFICATIONS:**
A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- 1.07 **REGULATORY REQUIREMENTS:**
A. Conform to applicable barrier free code and CABO\ANSI A117.1-1994 for requirements for the physically handicapped.
- 1.08 **DELIVERY, STORAGE, AND HANDLING:**
A. Deliver, store, protect and handle products to site under provisions of Section 01600.
B. Package signs, labeled in name groups.
C. Store adhesive attachment tape at ambient room temperatures.
- 1.09 **ENVIRONMENTAL REQUIREMENTS:**
A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
B. Maintain this minimum temperature during and after installation of signs.

PART 2 - PRODUCTS

- 2.01 **MANUFACTURERS:**
A. Manufacturers:
1. ASI Sign Systems.
2. The Southwell Company.
3. Supersine Co.
4. Substitutions: Refer to Section 01600.
- 2.02 **ENGRAVED SIGNS - Coordinate with Owner:**
A. Engraved Signs: Laminated colored plastic, 2 inches high for Room Signage and 6" high for Toiletroom; total thickness of 0.125 inch; lettering engraved through face material to expose

- core color. Characters formed to lettering style to match existing adjacent signage letters; face and core colors as selected by architect.
1. Face Color: Clear, Color as selected by Architect.
 2. Core Color: black.
 4. Height: varies.
 5. Edges: Square.
 6. Character Font: Arial.
- B. Provide a sign for the Toilettroom and a sign for each room on the Room Finish Schedule.
C. Coordinate with Owner/Architect for color and exact text.

2.04 ACCESSORIES:

- A. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Verify that substrate surfaces are ready to receive work.
B. Beginning of installation means installer accepts existing surfaces

3.02 INSTALLATION:

- A. Install in accordance with manufacturer's instructions.
B. Install accessibility emblems on entry doors where barrier free accessible, on the doors of barrier free accessible toilet rooms, as elsewhere where required by code.
C. Install signs after surfaces are finished, in locations as directed.
D. Mount signs at heights to meet applicable barrier free codes.
E. Locate sign on wall surface, level.

3.03 SCHEDULES:

- A. Provide a sign for each door into a specific room.
B. On or near door to each Classroom, or other type of instruction room, including Multipurpose Room, Media Center, Group Toilets, and on doors to each room opening onto a corridor or lobby; a three digit number.
C. On each Group Toilet: The name of the space plus the word 'Girls' or 'Boys' as appropriate.
D. On Corridor doors to Multipurpose, Media Center, Art Vocal Music, studio or similar space: The name of such space.

END OF SECTION 10441

SECTION 10520 - FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES**PART 1 - GENERAL****1.01 SECTION INCLUDES:**

- A. Fire extinguishers.
- B. Accessories.
- C. Furnishing all labor, materials and equipment necessary to completely install fire extinguishers and accessories shown on the Drawings and/or specified herein.

1.02 RELATED SECTIONS:

- A. Section 06114 - Wood Blocking and Curbing: Wood blocking and shims.
- B. Section 09250 - Gypsum Board Systems: Roughed-in wall openings and placement of rough-in frame for cabinets.
- C. Section 09900 - Painting: Field paint finish.

1.03 REFERENCES:

- A. ADA - Americans with Disabilities Act (ADA) - Hardware.
- B. NFPA 10 - Portable Fire Extinguishers.
- C. UL 8 - Foam Fire Extinguishers.
- D. UL 92 - Fire Extinguisher and Booster Hose.
- E. UL 154 - Carbon Dioxide Fire Extinguishers.
- F. UL 299 - Dry Chemical Fire Extinguishers.
- G. UL 626 – 2-1/2 Gallon Stored Pressure, Water Type Fire Extinguishers.
- H. UL 711 - Rating and Fire Testing of Fire Extinguishers.
- I. UL 1093 - Halogenated Agent Fire Extinguishers.

1.04 SUBMITTALS FOR REVIEW:

- B. Shop Drawings: Indicate cabinet physical dimensions; rough in measurements for recessed cabinets, wall bracket-mounted measurements, locations, and other pertinent information as requested by Architect.
- C. Product Data: Provide extinguisher operational features, anchorage details, color and finish.

1.05 SUBMITTALS FOR INFORMATION:

- B. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- C. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.06 SUBMITTALS AT PROJECT CLOSEOUT:

- B. Maintenance Data: Include test, refill or recharge schedules and re certification requirements.

1.07 QUALITY ASSURANCE:

- A. Provide units conforming to UL 711 and UL 92. Maintain one copy of each document on site.
- B. Provide fire extinguishers, hoses, cabinets and accessories from a single manufacturer.
- C. All equipment shall conform to NFPA 10 requirements.
- D. Provide new portable fire extinguishers that are UL listed and bear UL "Listing Mark" for type, rating and classification of extinguisher indicated.

1.08 REGULATORY REQUIREMENTS:

- A. Conform to applicable local code and NFPA 10 for requirements for extinguishers and accessories.

1.09 ENVIRONMENTAL REQUIREMENTS:

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 - PRODUCTS2.01 MANUFACTURERS:

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. J.L. Industries
 - 2. Larsen's Manufacturing Co.
 - 3. Potter-Roemer, Smith Industries
 - 4. Or Architect approved substitution.
- B. Specifications based on the products of J.L. Industries. Proprietary names used are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other accepted manufacturers.
- C. Substitutions: Under provisions of Section 01600.

2.02 EXTINGUISHERS:

- A. Multi-purpose Chemical Type: Class ABC, Model Cosmic 5E, 5 lb.
- B. Extinguishers shall be fully charged.
- C. Provide 3 extinguishers dispersed throughout the facility no more than 75 ft. apart.
- D. Unless otherwise noted, all fire extinguishers shown on drawings shall be mounted so that the top of the extinguishers is at 5'-0", maximum, above floor.

2.04 ACCESSORIES:

- A. Extinguisher Brackets: Formed steel, chromed finish.
- B. Surface mounted units - (1) for each zone of the complete building – 3 thus.

PART 3 - EXECUTION3.01 EXAMINATION:

- A. Verify height and location installations.

3.02 INSTALLATION:

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers on wall brackets as noted.

END OF SECTION 10520

SECTION 10800 - TOILET ROOM ACCESSORIES**PART 1 - GENERAL**1.01 **DESCRIPTION OF WORK:**

- A. Furnishing all labor, materials and equipment to completely install all items of this section shown on Drawings or specified herein.
- B. Coordinate with others for correct locations of and appropriate clearance for Toiletroom equipment. Inform Architect of any discrepancies prior to installation of equipment or other associated wall finishes.
- C. Coordinate whether material is supplied new or by Owner (salvaged) with installation by this Trade.
- D. **Providing and installing specialty fixtures associated with Toilet Rooms and utility areas.**

1.02 **RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 06100 - Rough Framing.
- B. Section 09100 - Metal Stud Framing System.
- C. Section 09250 - Gypsum Drywall System.

1.03 **QUALITY ASSURANCE:**

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set into concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.
- C. Single Source Manufacturer: Provide products of same manufacturer for each type of accessory unit, unless otherwise indicated.

1.04 **REFERENCES:**

- A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible To and Usable by Physically Handicapped People.
- B. ANSI/ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars and Strips.
- C. ANSI/ASTM A366 - Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- D. ANSI/ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.
- E. ANSI/ASTM B456 - Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
- F. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- G. ASTM A269 - Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

1.05 **SUBMITTALS:**

- A. Product Data: Provide product data describing size, finish, details of function, installation details for each accessory.
- B. Manufacturer's Installation Instructions: Submit manufacturer's installation instructions, including setting drawings, templates, directions for preparatory work, installation of anchorage devices in other work and sequencing.

1.06 **KEYING:**

- A. Supply four keys for each lockable accessory to Owner.
- B. Master key all accessories as directed by Owner.

1.07 **REGULATORY REQUIREMENTS:**

- A. Conform to ANSI A117.1 and applicable State Barrier Free codes for provisions for the physically handicapped.

1.09 **SEQUENCING AND SCHEDULING:**

- A. Coordinate the work of this section with the placement of internal wall reinforcement to receive anchor attachments.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bobrick Washroom Equipment, Inc.
 - 2. Bradley Corporation, Washroom Accessories Division
 - 3. Or Architect approved substitution.
- B. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to the exclusion of equivalent products of other accepted manufacturers.**

2.02 COMPONENTS - TOILET ROOM ACCESSORIES:

- A. Coat Hook:
 - 1. Door-mounted coat hook - with integral rubber bumper; solid aluminum casting with matte finish. Bobrick B-212, or Architect approved equal.
- B. Grab Bars: At Toilet Room locations where two bars are shown on Drawings or required by ADA: Peened, 1-1/2" non-slip gripping surface approved for barrier free use, with satin finish, 18-gauge type 304 stainless steel with snap cover over concealed mounting flange. Bobrick B-6806.99 Series or Architect approved equal.
 - 2. Provide a single, vertical grab bar at each B.F. toilet as required by ADA. Peened, 1-1/2" x 48" non-slip gripping surface approved for barrier free use, with satin finish, 18-gauge type 304 stainless steel with snap cover over concealed mounting flange. Bobrick B-6806.99 Series, or Architect approved equal
- C. Toilet Paper Dispenser:
 - 1. Recessed twin-roll dispenser, Contura Series or B-3888 or Architect approved equal. Where gypsum board partitions allow recessed applications.
- D. Mirror:
 - 1. Fixed mirror with No. 1 quality 1/4" mirror glass, type 304 stainless steel frame with satin finish, size as indicated on Drawings. Bobrick B-165 series or Architect approved equal.
- E. Soap Dispenser:
 - 1. Surface mounted, stainless steel dispenser with 40 fluid oz. capacity. Bobrick B-4112, or Architect approved equal.
- F. Surface-mounted paper Towel Dispenser: Satin finished stainless steel to dispense 400 C-fold towels. Bobrick B-4262-Contura Series, or equal.
- G. Sanitary napkin/Tampon Vendor:
 - 1. Stainless steel finish, surface mounted vendor. Bobrick B-47069-Contura Series, or Architect approved equal.
- H. Sanitary napkin disposal:
 - 1. Stainless steel finish, surface mounted disposal with shelf. Bobrick B-271, or Architect approved equal.
- I. Toilet Room Shelf – (1 for each Toilet Room)
 - 1. 5" x 24" stainless steel, satin finish, shelf. Bobrick B-295, or Architect approved equal.
- J. Fold-Down Baby Changing Station:
 - 1. Surface mounted, ADA compliant, fold down polyethylene diaper changing station with minimum static load rating of 250 lbs.; tamper-resistant fasteners; Koala KB200-00, or equal. Undersink Pipe Insulation - when not enclosed by base cabinet:
 - 1. Fully molded closed cell vinyl insulating pipe wrap, coordinate model number with specific plumbing pipe configuration at each required location (coordinate as necessary with Division 15 Mechanical):
 - a. Truebro, Inc., "Handi Lav-Guard" Kit - Color: White.
 - b. or approved equal.

2.03 MATERIALS:

- A. Sheet Steel: ANSI/ASTM A366.
- B. Stainless Steel Sheet: ASTM A167, Type 304.
- C. Tubing: ASTM A269, stainless steel.
- D. Fasteners, Screws, and Bolts: Hot-dip galvanized, tamper proof.
- E. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.
- F. Primer: As recommended by accessory manufacturer.
- G. Individually box or wrap each item suitably to prevent damage, with label identifying item and location for same.
- H. Provide each item complete with fasteners, anchorages, trim, back-up plates and other incidental items required for fastening to intended substrate.

2.04 FABRICATION:

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from single sheet of stock, free of joints.
- C. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- D. Back-paint components where contact is made with building finishes to prevent electrolysis.
- E. Shop-assemble components and package complete with anchors and fittings.
- F. Provide steel anchor plates, adapters, and anchor components for installation.
- G. Hot dip galvanized exposed and painted ferrous metal and fastening devices.

2.05 FACTORY FINISHING:

- A. Galvanizing: ANSI/ASTM A386 to 1.25 oz/sq. yd.
- B. Shop Primed Ferrous Metals: Pretreat and clean, spray-apply one coat primer and bake.
- C. Enamel: Where indicated, pretreat to clean condition, apply one coat primer and minimum two coats baked enamel.
- D. Chrome/Nickel Plating: Where indicated, comply with ANSI/ASTM B456, Type SC 2 satin (polished) finish.
- E. Stainless Steel: No. 4 satin luster finish typical for items specified herein.

PART 3 - EXECUTION3.01 EXAMINATION:

- A. Installer must examine the conditions under which the Work of this section is to be performed and notify Contractor in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in manner acceptable to the Installer.
- B. Beginning of installation means acceptance of existing conditions and substrates.
- C. **This contractor shall review existing and proposed substrate, and modify if required, to allow all semi and recessed equipment to be properly installed where noted on the Documents.**

3.02 PREPARATION:

- A. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation.
- D. This contractor shall be responsible to establish the location for all accessories allowing full access to all fixtures and maintaining required clearances for Barrier-Free requirements. Refer to Michigan Barrier-Free Requirements (ANSI A117.1) for heights and locations of all equipment.
- E. **Coordinate with mounting height and locations relative to the "Typical Mounting Heights and Clearances" diagrams within these Contract Documents, but Michigan Barrier-Free (ADA) and ANSI A117.1 shall determine any conflicts.**

3.03 INSTALLATION:

- A. Install fixtures, accessories and items in accordance with manufacturer's instructions.
- B. Install plumb and level, securely and rigidly anchored to in-wall blocking or structure and in locations and at mounting heights indicated.
- C. Coordinate with framing contractor for required blocking.

END OF SECTION 10800

SECTION 12355 – PRE-MANUFACTURED CABINETRY**PART 1 - GENERAL****1.01 WORK INCLUDED:**

- A. Provision and installation of pre-manufactured casework units as described in the Documents with a specific model/coded number indicated on the Documents.
- B. Supplying and installing Pre-manufactured casework in Kitchen, Toilet Rooms and where noted.
- C. Provide base and wall cabinets with all associated fillers to meet the requirements of the Style/Manufacturer or individual details noted below.
- D. Where Interior Elevations or Plans are annotated with casework abbreviations (see Section 2.01 D noted below), it shall be considered that these elements are pre-manufactured casework and should conform to this Section of the Specifications.
- E. Provision and installation of all necessary blocking, fasteners, and cutting and patching are included in the work of this section.
- F. Countertops associated with casework.
- G. Coordination of plumbing fixtures.

1.02 RELATED SECTIONS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section 06050 – Carpentry Materials and Accessories
- C. Section 06200 – Finish Carpentry
- D. Section 07900 – Joint Sealants
- E. Section 08800 – Glass and Glazing
- F. Section 10800 – Toilet Room Accessories

1.03 SUMMARY

- A. This section includes the following:
 - 1. Plastic laminate faced cabinets
 - 2. Plastic laminate countertops.

1.04 REFERENCES

- A. American National Standards Institute (ANSI).
- B. Builders Hardware Manufacturers Association (BHMA).
- C. Kitchen Cabinet Manufacturers Association (KCMA).
- D. Laminating Materials Association (LMA).
- E. National Electrical Manufacturers Association (NEMA).

1.05 DEFINITIONS

- A. Exposed Surfaces of Casework: Surfaces visible when doors and drawers are closed, including visible surfaces in open cabinets or behind glass doors.
- B. Semi-exposed Surfaces of Casework:
 - 1. Surfaces visible when behind opaque doors and drawer fronts are open, including interior faces of doors and interiors and sides of drawers.
 - 2. Bottoms of wall cabinets are defined as semiexposed.
- C. Concealed Surfaces of Casework:
 - 1. Surfaces not usually visible after installation, including sleepers, web frames, dust panels, bottoms of drawers, and ends of cabinets installed directly against and completely concealed by walls or other cabinets.
 - 2. Tops of wall cabinets and utility cabinets are defined as concealed.

1.06 SUBMITTALS

- A. Product Data: For the Following:
 - 1. Cabinets.
 - 2. Plastic-laminate countertops.

3. Cabinet hardware.
 - B. Shop Drawings: For cabinets and countertops, include plans, elevations, details, and attachments to other work. Show materials, finishes, **filler panels**, hardware, edge and backsplash profiles, cutouts for plumbing fixtures, **and layout and methods of joining countertops**.
 1. Include section drawings of typical and special casework, work surfaces and accessories.
 2. Indicate locations of plumbing and electrical service field connection by others.
 - C. Material Samples for Initial Selection: Manufacturer's color charts showing the full range of colors, textures, and patterns available for each type of material exposed to view.
 - D. Material Samples for Verification: For the following materials; in sets showing full range of color, texture, and pattern variations expected:
 1. Plastic laminate for countertops, 8 by 10 inches.
 2. One unit of each type of exposed hardware.
 - E. Product Certificates: Signed by manufacturers of casework certifying that products furnished comply with specified requirements.
- 1.07 QUALITY ASSURANCE
- A. Source Limitations for Cabinets: Obtain cabinets through one source from a single manufacturer.
 - B. Product Designations: Drawings indicate size, configurations, and finish material of casework by referencing designated manufacturer's catalog numbers. Other manufacturer's casework of similar sizes, similar door and drawer configurations, similar finish materials, and complying with the Specifications may be considered. Refer to Division 1 Section Substitutions.
 - C. Quality Standards: Unless otherwise indicated, comply with the following standards:
 1. Cabinets: KCMA A161.1.
 2. Plastic Laminate Countertops: KCMA A161.2.
- 1.08 PROJECT CONDITIONS
- A. Environmental Limitations: Do not deliver or install residential casework until building is enclosed, wet-work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
 - B. Established Dimensions: Where residential casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Coordinate construction to ensure that the actual dimensions correspond to established dimensions. Provide fillers and scribes to allow for trimming and fitting.
 - C. Field Measurements:
 1. For cabinets: Where residential casework is indicated to fit existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide all filler panels required to complete an installation and scribe if necessary.
 2. Field Measurements For Countertops: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- 1.09 COORDINATION
- A. Coordinate layout installation of blocking and reinforcement in partitions for support of residential casework.

PART 2 – PRODUCTS

2.01 GENERAL:

- A. Proprietary names and/or model numbers used to designate products or materials are not intended to imply that products of named manufacturers are required to the exclusion of equivalent products of other accepted manufacturers. Pre-bid requests for approval of other products may be accepted in accordance with Section 00100 – Instructions to Bidders. Post-Bid substitutions may be accepted in accordance with Section 01600 – Product Substitutions.
- B. Acceptable Manufacturers of casework: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Merillat – a Masco Company
 - 2. KraftMaid Cabinetry, Inc.
 - 3. Schrock
 - 4. WoodMode
 - 5. or equal
- C. **Basis of Cabinet Design. A casework product from other manufacturers are acceptable in so much that the following style of door, casework material and color noted is available:**
 - 1. **Provide a flush panel door and drawer face in a Glencoe Square door style in white laminate by Merillat Masterpiece Series, or equal.**
 - 2. For deviations from style and manufacturer noted above – follow the specifications noted in Section 2.03 thru 2.06.
- D. Acceptable Manufacturers of Additional, related products: Subject to compliance with specified requirements, provide products by one of the following:
 - 1. Plastic Laminate for Countertops:
 - a. Formica Corp
 - b. Laminart
 - c. Nevamar Corp.
 - d. Pioneer Plastics Corp.
 - e. Westinghouse Electric Corp.; Specialty Products Div.
 - f. Wilson: Ralph Wilson Plastics Co.
- E. **Casework nomenclature: For standardized casework - sizes, configurations and heights may be noted on Elevations or Plans per the following abbreviations:**
 - a. DBx – Drawer Base cabinet, with x= number of drawers
 - b. B – typical base cabinets
 - c. BBC – Base Blind Corner
 - d. BCFS – Base Corner Fixed Shelf
 - e. BCLS – Base Corner Lazy Susan
 - f. VB – vanity base cabinets – may vary in depth
 - g. FH – full-height door as base cabinet
 - h. SB – sink base cabinet
 - i. PB or PW – peninsula base or wall cabinet
 - j. WBC – Wall Blind cabinet
 - k. CFO – cabinet front overlay (only a face frame and door assembly)
 - l. Fx – filler panel (x= filler width)
 - m. VCB – vanity cabinet base – may vary in depth.
 - n. Wxxyy – wall cabinet width in inches x height in inches
 - o. Other options may be available per the particular manufacturer’s line of options. These may be noted or described on the Elevations/Plans.
- F. **Casework indicated with standard nomenclature** may be supplied as pre-manufactured units or custom-built as long as they meet the intent of the Documents and meet or exceed the specifications herein noted.

2.02 COLORS, TEXTURES, AND PATTERNS

- A. Colors, Textures, and Patterns: Panel shall be a solid color laminate selected from standard options of laminate manufacturer.

2.03 CABINET MATERIALS

- A. Exposed Materials – typically face frame: Comply with the following:

1. Wire pulls, 4" centers with brushed chrome finish.
 - C. Hinges: Concealed European-style, 6-way adjustable hinges.
 - D. Drawer Guides: Undermount, self-closing drawer guides, designed to prevent rebound when drawers are closed; with nylon-tired, ball bearing rollers; and complying with BHMA A156.9, type B05091.
 1. Standard extension runners with easy-release mechanism.
- 2.07 COUNTERTOP MATERIALS High-Pressure Plastic Laminate: shall meet NEMA LD3-1995 standards;

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install casework with no variations in flushness of adjoining surfaces; use concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match casework face.
- B. Install casework without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.
- C. Install casework and countertop level and plumb to a tolerance of 1/8-inch in 8 feet.
- D. Fasten cabinets to adjacent units and to backing.
 1. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches o. c.
- E. Protect finished surfaces from damage or staining resulting from subsequent work until Date of Substantial Completion. Repair or replace damaged cabinet work, including warped or loose members.

END OF SECTION 12355

**CITY OF ANN ARBOR
LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE**

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than \$10,000 for any twelve-month contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than \$10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than \$10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here No. of employees__

The Contractor or Grantee agrees:

- (a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as \$13.13/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than \$14.65/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance (Section 1:815(3)).

Check the applicable box below which applies to your workforce

Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits

Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits

- (b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.
- (c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.
- (d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.
- (e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

Company Name

Street Address

Signature of Authorized Representative

Date

City, State, Zip

Print Name and Title

Phone/Email address

**CITY OF ANN ARBOR
LIVING WAGE ORDINANCE**

RATE EFFECTIVE APRIL 30, 2017 - ENDING APRIL 29, 2018

\$13.13 per hour

If the employer provides health care benefits*

\$14.65 per hour

If the employer does **NOT** provide health care benefits*

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than \$10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

ENFORCEMENT

The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than \$500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

* Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed \$.50 an hour for an average work week; and the employer cost or contribution must equal no less than \$1/hr for the average work week.

The Law Requires Employers to Display This Poster Where Employees Can Readily See It.

**For Additional Information or to File a Complaint Contact
Colin Spencer at 734/794-6500 or cspencer@a2gov.org**



Vendor Conflict of Interest Disclosure Form

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict of interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
5. Please note any exceptions below:

| Conflict of Interest Disclosure* | |
|---|---|
| Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest. | <input type="checkbox"/> Relationship to employee <hr style="border: 0; border-top: 1px solid black;"/> <input type="checkbox"/> Interest in vendor's company <input type="checkbox"/> Other (please describe in box below) |
| | |

*Disclosing a potential conflict of interest does not disqualify vendors. In the event vendors do not disclose potential conflicts of interest and they are detected by the City, vendor will be exempt from doing business with the City.

| I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the Vendor by my signature below: | | |
|---|---------------------|--|
| | | |
| Vendor Name | Vendor Phone Number | |
| | | |
| Signature of Vendor Authorized Representative | Date | Printed Name of Vendor Authorized Representative |

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500, procurement@a2gov.org

CITY OF ANN ARBOR NON-DISCRIMINATION ORDINANCE

Relevant provisions of Chapter 112, Nondiscrimination, of the Ann Arbor City Code are included below. You can review the entire ordinance at www.a2gov.org/departments/city-clerk

Intent: It is the intent of the city that no individual be denied equal protection of the laws; nor shall any individual be denied the enjoyment of his or her civil or political rights or be discriminated against because of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight.

Discriminatory Employment Practices: No person shall discriminate in the hire, employment, compensation, work classifications, conditions or terms, promotion or demotion, or termination of employment of any individual. No person shall discriminate in limiting membership, conditions of membership or termination of membership in any labor union or apprenticeship program.

Discriminatory Effects: No person shall adopt, enforce or employ any policy or requirement which has the effect of creating unequal opportunities according to actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight for an individual to obtain housing, employment or public accommodation, except for a bona fide business necessity. Such a necessity does not arise due to a mere inconvenience or because of suspected objection to such a person by neighbors, customers or other persons.

Nondiscrimination by City Contractors: All contractors proposing to do business with the City of Ann Arbor shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All city contractors shall ensure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon any classification protected by this chapter. All contractors shall agree not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of any applicable protected classification. All contractors shall be required to post a copy of Ann Arbor's Non-Discrimination Ordinance at all work locations where its employees provide services under a contract with the city.

Complaint Procedure: If any individual has a grievance alleging a violation of this chapter, he/she has 180 calendar days from the date of the individual's knowledge of the allegedly discriminatory action or 180 calendar days from the date when the individual should have known of the alleged discriminatory action to file a complaint with the city's Human Rights Commission. If an individual fails to file a complaint alleging a violation of this chapter within the specified time frame, the complaint will not be considered by the Human Rights Commission. The complaint should be made in writing to the Human Rights Commission. The complaint may be filed in person with the City Clerk, by e-mail (hrc@a2gov.org), by phone (734-794-6141) or by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107). The complaint must contain information about the alleged discrimination, such as name, address, phone number of the complainant and location, date and description of the alleged violation of this chapter.

Private Actions For Damages or Injunctive Relief: To the extent allowed by law, an individual who is the victim of discriminatory action in violation of this chapter may bring a civil action for appropriate injunctive relief or damages or both against the person(s) who acted in violation of this chapter.

THIS IS AN OFFICIAL GOVERNMENT NOTICE AND
MUST BE DISPLAYED WHERE EMPLOYEES CAN READILY SEE IT.

Required Bid and Contract Documents
Washtenaw County Community Development Block Grant (CDBG) Program
Public Infrastructure and Facilities Improvement Projects

This is a Federally funded project. The contractor and subcontractors must comply with HUD procurement provisions in CFR 24 Part 85.36, Equal Employment Opportunity requirements, the Copeland “Anti-Kickback” Act, the Davis-Bacon Act, Contract Work Hours and Safety Standards Act, Section 3 of the Housing and Urban Development Act and other requirements as set forth in the bid documents. Minority and Women Owned Business Enterprises and Section 3 Business Concerns seeking bid opportunities under this project are encouraged to respond.

Enclosed is a set of documents related to compliance with Federal and local requirements concerning public infrastructure and facilities improvement projects under Washtenaw County’s Community Development Block Grant (CDBG) program:

1. Federal Contract Provisions
2. Federal Labor Standards Provisions
3. Equal Opportunity
 - a. Equal Opportunity Clause
 - b. Standard Federal Equal Employment Opportunity Construction Contract Specifications
 - c. Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity
4. Section 3
 - a. Section 3 Clause
 - b. Washtenaw County Section 3 Contractor List
 - c. Section 3 Definitions
 - d. Washtenaw County Section 3 Fact Sheet, Business Certification & Reporting Instructions
5. Required Contractor Documents
 - a. Section 3 Plan Information Sheet
 - b. Sub-Contractor Information Sheet
 - c. Project Wage Rate Sheet
 - d. Equal Employment Opportunity Poster
 - e. Employee Rights Under the Davis-Bacon Act Poster
 - f. Certified Payroll
 - g. Payroll Deduction Authorization for “Other Deductions” on Certified Payroll
 - h. Waiver of Lien
 - i. Full Unconditional Waiver
 - j. Sworn Statement
 - k. Section 3 Summary Report
6. Project Wage Decision

Federal Contract Provisions

Federal Contract Provisions

1. Contracts other than small purchases shall contain administrative, contractual or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as may be appropriate.
2. All contracts in excess of \$10,000 shall contain suitable provision for termination for cause and for convenience by the grantee, including the manner by which it will be effected and the basis for settlement.
3. All contracts awarded in excess of \$10,000 by grantees and their contractors or subgrantees shall contain a provision requiring compliance with Executive Order 11246, entitled "Equal Employment Opportunity," as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR Part 60).
4. All contracts and subgrants for construction or repair shall include a provision for compliance with the Copeland "Anti-Kickback" Act (18 USC 874) as supplemented in Department of Labor regulations (29 CFR, Part 3).
5. All construction contracts in excess of \$2,000 must include a provision for compliance with the Davis-Bacon Act (40 USC 276a to a-7) as supplemented by Department of Labor regulations (29 CFR, Part 5).
6. Where applicable, all contracts awarded by grantees and subgrantees in excess of \$2,000 for construction contracts and in excess of \$2,500 for other contracts which involve the employment of mechanics or laborers shall include a provision for compliance with Section 103 and 107 of the Contract Work Hours and Safety Standards Act (40 USC 327-330) as supplemented by the Department of Labor regulations (29 CFR, Part 5).
7. The contract shall include notice of requirements and regulations pertaining to reporting and patent rights respect to any discovery or invention which arises or is developed in the course of or under such contract, and of grantor agency requirements and regulations pertaining to copyrights and rights in data.
8. All negotiated contracts awarded by grantees shall include a provision to the effect the grantee, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the contractor which are directly pertinent to that specific contract, for the purpose of making audit, examination, excerpts, and transcriptions.

9. Grantees shall require contractors to maintain all required records for three years after grantees make final payments and all other pending matters are closed.

10. Contracts, subcontracts, and subgrants of amounts in excess of \$100,000 shall contain a provision which requires compliance with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC 1857(h)), Section 508 of the Clean Water Act (33 USC 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR, Part 15), which prohibit the use of non-exempt Federal contracts, grants, or loans of facilities included on the EPA List of Violating Facilities. The provision shall require reporting of violations to the grant agency and to the USEPA Assistance Administrator for Enforcement (EN-329).

11. Contracts shall recognize mandatory standards and policies relating to energy efficiency which are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (P.L. 94-163).

Federal Labor Standards Provisions

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section I(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part

of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been

communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) **Apprentices.** Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who

is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) **Trainees.** Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be

awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

11. C omplaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds \$100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds \$100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

Equal Opportunity

EQUAL OPPORTUNITY CLAUSE
Executive Order 11246, as amended: 41 CFR Part 60-1.4(b)

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however,* That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS
(Executive Order 11246: 41 CFR Part 60.4.3)

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has

employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the FEDERAL REGISTER in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

(b) The notice set forth in 41 CFR 60-4.2 and the specifications set forth in 41 CFR 60-4.3 replace the New Form for Federal Equal Employment Opportunity Bid Conditions for Federal and Federally Assisted Construction published at 41 FR 32482 and commonly known as the Model Federal EEO Bid Conditions, and the New Form shall not be used after the regulations in 41 CFR part 60-4 become effective.

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION
TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY
Executive Order 11246: 41CFR Part 60-2

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

| Time- tables | Goals for minority participation for each trade | Goals for female participation in each trade |
|-------------------------|--|---|
| | 8.5% | 6.9% |

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any).

Section 3

SECTION 3 CLAUSE
24 CFR Part 135.38

All section 3 covered contracts shall include the following clause (referred to as the section 3 clause):

A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.

C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.

D. The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.

F. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

Washtenaw County OCED Approved Section 3 Contractors

| Name | Address | City | Zip Code | Contact | Phone | Type |
|--------------------------------------|-------------------------------|-------------|-----------------|---------------------|--------------|---------------------|
| Section 3 | | | | | | |
| A.H. Construction, LLC | 5417 Daytona | Ypsilanti | 48197 | Ali Huwio | 734-481-1983 | Housing Rehab |
| Advanced Construction & Firestop LLC | 14216 E Austin | Manchester | 48158 | Jim Stachnik | 734-255-4005 | Housing Rehab |
| Huddleston Group & Associates, LLC | 3961 Hillside Drive | Ypsilanti | 48197 | Guy Huddleston | 313-586-3994 | HVAC, Housing Rehab |
| LaSant Building. Inc. | 7754 Hidden Ridge Lane | Northville | 48168 | Danielle Bass | 248-486-6868 | Housing Rehab |
| Saladino Construction Company Inc. | 3303 W. North Territorial Rd. | Ann Arbor | 48105 | Zina Saladino | 734-665-5913 | Paving Concrete |
| Stephen B. St. Clair, Inc | 1300 Tefft Ct. Suite #5 | Saline | 48176 | Stephen B. St.Clair | 734-944-5253 | Housing Rehab |
| Zamperla Brothers LLC | 2521 E. Morgan Rd | Ann Arbor | 48108 | Lorenzo Zamperla | 734-417-5741 | Housing Rehab |

Date: as of 7/12/2016

Contractor Email List

Instructions:

1. Click on the combined list of emails under Complete List.
2. Hold the Ctrl key and hit the C key to copy the list to the clipboard.
3. Open up a new email message or run a report and Export using the Microsoft Mail option
4. Click on the To: box
5. Hold the Ctrl key and hit the V key to paste the list into the To: box.
6. Type your message and send it.

Washtenaw County OCED Approved Section 3 Contractors

Complete List

alihuwio@sbcglobal.net; UgMug@aol.com; saladinoco@aol.com; office@lasantbuilding.com; jim.stachnik@yahoo.com; zamperlabrothers@gmail.com; hudconstruction@att.net

Itemized List

| Company Name | Email Address |
|--------------------------------------|--|
| A.H. Construction, LLC | alihuwio@sbcglobal.net/ email@ahroofplus.com |
| Advanced Construction & Firestop LLC | jim.stachnik@yahoo.com |
| Huddleston Group & Associates, LLC | hudconstruction@att.net |
| LaSant Building, Inc. | office@lasantbuilding.com |
| Saladino Construction Company Inc. | saladinoco@aol.com |
| Stephen B. St. Clair, Inc | UgMug@aol.com |
| Zamperla Brothers LLC | zamperlabrothers@gmail.com |

SECTION 3 DEFINITIONS

"SECTION 3 RESIDENT" MEANS:

1. A public housing resident who resides in the metropolitan area* (Washtenaw County) or non-metropolitan county in which the Section 3 covered assistance is expended and who is considered to be a low-to very low-income person; or
2. An individual who resides in the metropolitan area* (Washtenaw County) or non-metropolitan county in which the Section 3 covered assistance is expended and who is considered to be a low-to very low-income person.

2016 LOW-INCOME LIMITS FOR WASHTENAW COUNTY

| Family Size: Number in Household | Household Income (less than) |
|-----------------------------------|------------------------------|
| <input type="checkbox"/> 1 PERSON | \$46,000 |
| <input type="checkbox"/> 2 PERSON | \$52,600 |
| <input type="checkbox"/> 3 PERSON | \$59,150 |
| <input type="checkbox"/> 4 PERSON | \$65,700 |
| <input type="checkbox"/> 5 PERSON | \$71,000 |
| <input type="checkbox"/> 6 PERSON | \$76,250 |
| <input type="checkbox"/> 7 PERSON | \$81,500 |
| <input type="checkbox"/> 8 PERSON | \$86,750 |

"NEW HIRE" MEANS:

A person who is not on the contractor's payroll at the time of selection for the Section 3 award.

SECTION 3 BUSINESS DEFINED

A Section 3 Business concern is a business:

1. That is **51 % or more owned** by a Section 3 Washtenaw County resident(s) and have total household incomes less than the income limits in the above table based on the number of persons in the family; or
2. Whose **permanent, full-time employees** include persons, at **least 30 %** of whom are currently Section 3 Washtenaw County residents and have total household incomes less than the income limits in the above table based on the number of persons in the family; or
3. That provide evidence of a commitment to subcontract in excess of 25 % of the total dollar award of all subcontracts to be awarded to business concerns that meet the qualifications set forth in (1) or (2) above. Contractors must complete three Section 3 covered projects with Washtenaw County and successfully meet the requirements for Section 3 for those three projects in order to apply for Section 3 Business Concern status under this option with Washtenaw County.

*=Washtenaw County is located in the Ann Arbor Metropolitan Statistical Area, which is entirely comprised of Washtenaw County (per U.S. President's Office of Management and Budget)

- A person seeking the training or employment preference; or a business seeking the preference provided by Section 3 bears the responsibility of providing evidence (if requested) that the person is eligible for that preference.

A. PURPOSE

The purpose of Section 3 is to ensure that employment and other economic opportunities created by HUD assistance to construction and rehabilitation projects is directed to low-income persons.

B. SECTION 3 COVERED PROJECT OR CONSTRUCTION CONTRACT CRITERIA

A Section 3 covered project is one that meets the Section 3 threshold level that is, a Project exceeds \$200,000 in Federal assistance for housing construction, reconstruction, conversion, rehabilitation or public construction.

A Section 3 covered construction contract applies to contractors and subcontractors when any *contract or subcontract* exceeds \$100,000 for housing construction, reconstruction, conversion, rehabilitation or public construction.

C. REQUIRED COMPLIANCE GOALS

1. **Employment - 30%** of the aggregate number of **new hires** for a covered project will be low income persons (A low income person is defined as having a family income less than 80% of the HUD established median income for Washtenaw County as found in the Section 3 Resident Income Verification Form.).
2. **Contracting** - Award at least **10%** of the total dollar amount for building trades work related to the project and at least **3 %** of all other covered contracts to Section 3 businesses.

D. SECTION 3 STRATEGY OR PLAN REQUIREMENT

Prior to or at the time of the contract signing between owner/developer and the contractor for the work on this project, the contractor is required to develop and complete with owner/developer, a Section 3 strategy or plan with final approval of the Section 3 strategy or plan by the Washtenaw County/City of Ann Arbor Office of Community and Economic Development (OCED). The Section 3 Plan must include, but not be limited to, the following, all per the requirements of Section 3:

1. Section 3 contracting goals for the construction contract and other contracts on the project;
2. Section 3 employment and training goals for the project;
3. Outreach to solicit Washtenaw County Section 3 Business Concerns;
4. Outreach to solicit Section 3 Washtenaw County Residents;
5. Project neighborhood area for the project;
6. Section 3 coordinator.

OCED has a template or model Section 3 Plan/Strategy available that you may use for the development of the Section 3 strategy or plan for the project. OCED also has a list of certified Washtenaw County Section 3 Business Concerns.

D. SECTION 3 BUSINESS CERTIFICATION APPLICATIONS:

Applications for Section 3 Business Certification may be obtained from the ***Washtenaw County OCED, 415 W. Michigan Ave., Suite 2200, P.O. Box 915, Ypsilanti, MI 48197.***

APPLICATION PROCESS:

To be considered for certification as a Section 3 Business Concern, a business must complete the ***Section 3 Clause, submit the appropriate Section 3 Business Certification Forms and provide all required supporting documentation.***

1. (Category 1) Business Ownership:

- Ø When a qualified Section 3 Resident is the primary owner having 51% or more ownership he/she (or, if less than 51%, holds the greatest percentage of ownership) must complete the *Section 3 Business Certification Form (51% Section 3 Resident Ownership)* form. This category was created by HUD for business concerns that are primarily owned by a person(s) that meet the HUD definition of being low income.
- Ø If there are two or more Section 3 Resident owners that together own 51% or more of the business, each additional owner (not having majority ownership) must complete the *Section 3 Resident Income Verification Form (Section 3 Business Certification)*.

2. (Category 2) Percentage of Employees Criteria:

- Ø A business having at least 30% permanent, full time Section 3 Residents on the payroll completes the *Section 3 Business Certification Form (30% Section 3 Resident Employment)*. At least 30% of permanent, full

time employees must be Section 3 Residents or within three (3) years of the date of first employment with the business were Section 3 Residents.

- θ A Section 3 Resident Income Verification Form (Section 3 Business Certification) must be completed by each Section 3 Resident employee as evidence that each individual meets the HUD definition of a Section 3 Resident.

E. DOCUMENTATION:

- θ The following completed forms are required for certification:
 - Section 3 - **51% or 30%** Business Certification Application;
 - Section 3 Clause;
 - Register with the Office of Community and Economic Development to become an approved contractor and/or subcontractor;
 - Submit Articles of Incorporation with State of Michigan Seal;
 - Submit Ownership or Partnership Agreement(s) or if applicable, Notarized Affidavit or Secretary of State Certification to confirm that applicant(s) is or are the major shareholder(s)/owner(s);
 - Submit Capacity evaluation: demonstration of business experience, i.e., list at least 10 previous jobs, existing jobs and 3 current references;
 - Submit Largest Contract Award verification;
 - If 51% Section 3 Resident Ownership; Submit Most Recent IRS Tax Statement (Individual(s) and Corporate or if a Sole Proprietor Submit IRS 1040 with Schedule C to confirm income.
 - Submit Identification (i.e. Passport, Drivers License)
 - Workers Compensation Certificate

F. CERTIFICATION:

- a. The Section 3 Business Certification Letter will be issued to acknowledge that a business has met the criteria established by the HUD Act of 1968, 24 CFR PART 135 - Section 3.
 - The business shall be listed in the Section 3 Washtenaw County/City of Ann Arbor OCED Business Directory provided the business also completes a contractor or sub-contractor application (as applicable) to be an approved contractor/sub-contractor with Washtenaw County/City of Ann Arbor OCED. Alternatively, the contractor/sub-contractor could choose to be a Section 3 business concern for only the project.

G. REPORTING RESPONSIBILITIES (Transmit reports via Email or as hard copies to address below)

During the life of the project these forms are collected by the **Owner/Developer**, checked for accuracy and completeness and submitted with the Request for Reimbursement to the Washtenaw County/City of Ann Arbor Office of Community and Economic Development (OCED) . If there is no disbursement request within a quarter, submit the report to the Compliance Officer no less than quarterly.

SECTION 3 CLAUSE ACKNOWLEDGEMENT FORM

1. **Owner/Developer** completes Section 3 Clause Acknowledgement Form (Submit once during life of project). The Section 3 Clause is required in every Section 3 covered contract and stipulates Section 3 applicability and requirements.
2. **Covered Contractor/Subcontractor** completes Section 3 Clause Acknowledgement Form (Submit once during life of project). The Section 3 Clause is required in every Section 3 covered contract and stipulates Section 3 applicability and requirements.

PERMANENT EMPLOYEE LISTING

1. **Owner/Developer** provides a complete list of permanent employees, including name and job category.
2. **Covered Contractor/Subcontractor** provides a complete list of permanent employees, including name and job category.

SECTION 3 SUMMARY REPORT FORM (HUD FORM 60002)

1. **Owner/Developer** completes the Section 3 Summary Report Form to account for all construction Contractors and subcontractors and businesses providing other services working on the project.
2. **Covered Contractor/Subcontractor** completes the Section 3 Summary Report Form to report all new hires for the covered project and the construction contracts and subcontracts with Section 3 Business Concerns. Contractor/subcontractor provides **all** *Section 3 Resident New Hires* the *Section 3 Income Verification Form* for completion and signature and proof of residency.

Transmit Documents to:

Terry R. Brinkman

Office of Community and Economic Development: 415 W. Michigan Ave., Suite 2200, P.O. Box 915, Ypsilanti, MI 48197, Phone: (734) 544-2985, Email: brinkmat@ewashtenaw.org

Required Contractor Documents

Section 3 Plan Information Sheet
Complete all items highlighted in Gray
For [Project Name and Address]

Name of General Contractor: _____

Address: _____

Primary Contact _____

Phone number: _____

Email: _____

Goals

Contracting:

To demonstrate compliance with Section 3 regulations, it is desirable to award at least 10 percent of the total dollar amount of all Section 3 covered contracts for building trades work.

Dollar amount of the construction contract [this is your total bid amount]: _____

10% of the total contract is [this is 10% of your total bid amount]: _____

These goals are affirmed: Initials: (General Contractor) _____

If we do not feel it is feasible to meet the minimum goals set forth above, we will be prepared to demonstrate why it was not possible. We understand failure to follow our Section 3 Plan could result in the Secretary of Housing and Urban Development (“HUD”) finding us non-compliant with the Section 3 regulations.

Employment and Training:

_____ [insert contractor name here] (the contractor) and all subcontractors will follow the requirements outlined in *Housing and Urban Development Act of 1968 Section 3 Plan for Washtenaw County/City of Ann Arbor Office of Community Development* (Dated June 2010) (County/City OCED Section 3 Plan). The contractor must complete certifications acknowledging the Section 3 contracting and employment provisions required by the County/City OCED Plan. Such certifications shall be adequately supported with appropriate documentation as referenced in the form. The required forms are attached as Attachments 1-17 at the end of this document [to be attached with the final version of the Section 3 Plan]. As part of the submittal of the Section 3 Resident Application Form (Attachment 5), each applicant must submit a copy of their PHA/IHA Residential lease less than 3 years from day of employment (if PHA/IHA resident), or most recent individual IRS Tax Statement or any other documentation for proof of household income as requested by OCED. All applicants will be required to submit copies of their identification (i.e. Passport, Drivers License) that includes their current residential address.

Public Agency, Covered Contractors and Covered Subcontractors

To meet the contracting and employment requirements of Section 3, the following minimum steps must be taken by the Public Agency, covered contractor and covered subcontractor:

1. Obtain a list of certified Section 3 business concerns from OCED.
2. Attend all pre-bid and pre-construction conferences to obtain information about the Section 3 program requirements.
3. Solicit at least 3 bids from the OCED list of Section 3 business concerns. If such list has fewer than three (3) qualified businesses, then the contractor/subcontractor must contact the entire list.
4. Provide plans and specifications or information regarding the location of plans to Section 3 business concerns.
5. Attempt to the greatest extent feasible to meet the following project contracting and employment goals:
 - o 10% of the total dollar amount of all Section 3 covered contracts for building trades work arising in connection with housing rehabilitation, housing construction, and other public construction will be awarded to qualifying Section 3 business concerns for this project.
 - o At least 3% of the total dollar amount of all other Section 3 covered contracts (i.e. architect, appraisal, etc.) will be awarded to qualifying Section 3 business concerns for this project.
 - o The goal of employment in Section 3 covered contracts is 30% of the aggregate number of new hires in any fiscal year will be Section 3 residents for this project.

Goals apply to all construction costs of the project, not just the amount of HUD financial assistance.

Records must be maintained on goals reached, and efforts/actions taken to reach goals. If goals are not met, a description of impediments encountered despite actions taken must be included. Reporting of such efforts/actions must be made to the OCED on forms supplied by the OCED.

Contractor's Requirements in Employing Section 3 Participants

Under the OCED Section 3 Program, contractors and subcontractors are required to:

Provide employment opportunities to Section 3 residents/participants in the priority order listed below:

- A. Category 1 – Section 3 Resident
 - o Residents of the housing development or development for which the contract shall be expended.
- B. Category 2 – Section 3 Resident
 - o Section 8 residents as well as all other Washtenaw County residents residing in the vicinity of the project who meet the income guidelines for Section 3 preference (refer to Section 3 Income Limits for Ann Arbor Metropolitan Statistical Area).
- C. Category 3 – Section 3 Resident
 - o Participants in HUD Youth build program being carried out in the project boundary area.
- D. Category 4 – Section 3 Resident
 - o Section 8 residents as well as all other residents residing in Washtenaw County who meet the income guidelines for Section 3 preference (refer to Section 3 Income Limits for Ann Arbor Metropolitan Statistical Area).

To demonstrate compliance with Section 3 regulations, it is desirous to employ Section 3 residents as 30 percent of the aggregate number of new hires, and to provide training to those new hires. We agree to provide information regarding existing employees and hiring needs as a part of this plan.

A concerted effort will be made to meet the goals in this plan. If the goals are not met, we agree to provide an explanation of challenges in meeting the goals described in this plan, and documentation of our efforts to reach these goals.

Outreach

We are committed to conduct an aggressive outreach campaign to make Section 3 Businesses and Section 3 Residents aware of contracting and employment opportunities in connection with this Section 3 Covered Project. Efforts will include, but not be limited to [Review the following, make changes if you would like or you can go with the following strategies. You are required to do the third bulleted item below – contacting all the approved Section 3 businesses as relevant to the project]:

- Publication of opportunities in the Washtenaw County Press or other local newspapers.
- Publication of opportunities with Michigan Works.
- Inviting Section 3 business concerns that have been certified by the Washtenaw County/City of Ann Arbor Office of Community and Economic Development (OCED) to relevant bidding opportunities.
- Use of signage at the project site and flyers posted in the neighborhood and surrounding areas.
- Notification to the Ann Arbor Housing Commission, Barrier Busters, Washtenaw Housing Alliance, and Washtenaw County Continuum of Care, and other appropriate organizations.
- Notification of potential bidding opportunities, training or employment opportunities to Neighborhood and Non-profits groups servicing low-income persons.
- Communicate opportunities to contractor and trade organizations, employment agencies and career centers.

It is not required to include all of these methods in a Section 3 implementation strategy. However, a robust strategy that makes a good faith effort to meet the objectives stated in this plan is expected. Washtenaw County/City of Ann Arbor Office of Community and Economic Development reserves the right to request documentation of efforts made (e.g. proof of advertisement in local newspapers, flyers, and other modes of communications) in order to meet Section 3 goals at any time.

Section 3 Coordinator

Name: _____

Contact information: _____

This person will serve as the main point of contact for all Section 3 related issues on behalf of general contractor, and subcontractors.

Estimated Workforce Needed for Section 3 Covered Project (Prime/General Contractor) to be included as Attachment 3 in the final Section 3 Plan

| | |
|------------------------|--|
| Name of Company | |
| Project Name | |
| Period Covered | |
| Date Submitted | |

| Job Category | Total Estimated Positions Needed for Project | Number of Positions Occupied by Permanent Employees | Number of Positions to be Filled with Section 3 Residents |
|---------------------|---|--|--|
| | | | |
| | | | |
| | | | |
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| | | | |
| | | | |

If no new job opportunities will be available during this project, state the reason below:

Reporting

We agree to provide Washtenaw County/City of Ann Arbor Office of Community and Economic Development the following documentation after the Section 3 qualified project is substantially completed, and will freely submit this information at any time if requested by OCED.

- Washtenaw County/City of Ann Arbor Office of Community and Economic Development Section 3 Summary Report
- Contract and Subcontract Activity Report
- The contractor will present a list, to the Section 3 Coordinator, of the number of subcontracting and/or employment opportunities expected to be generated from the contract.
- All the applicable required forms to meet Section 3 Requirements, including, but not limited to the forms found in Attachments 1-17 of this document [to be inserted as attachments in final version of Section 3 Plan].

General Statement

as the Public Agency, and _____, as the general contractor are committed to comply with the Section 3 act, the Section 3 regulations, and Washtenaw County/City of Ann Arbor Office of Community and Economic Development (MSHDA) Section 3 Guidelines. It is our desire to work together to ensure compliance, to the greatest extent feasible, through the awarding of contracts for work and services to Section 3 companies, and to provide employment and training to Section 3 residents. We commit to include the Section 3 clause in the construction contract and all subcontracts. All subcontractors interested in submitting bids for contracts will be informed of the Section 3 requirements and goals. We agree to provide Washtenaw County/City of Ann Arbor Office of Community and Economic Development (OCED) with copies of all bids received in response to the invitation to bid and copies of all contracts awarded in excess of \$100,000.00.

General Contractor:

(Print/type name of organization)

By: _____ [signature required]

(Print/type name and title)

Date: _____

The contents of this Draft Section 3 Plan will be inserted into the final Section 3 Plan, which will include Attachments 1-17.

Project Wage Rate Sheet

U.S. Department of Housing and Urban Development
Office of Labor Relations

| PROJECT NAME: | | | WAGE DECISION NUMBER/MODIFICATION NUMBER: | | | |
|---|-------------------------|-----------------|---|--------------------------------|----------------------|---------------|
| PROJECT NUMBER: | | | PROJECT COUNTY: | | | |
| WORK CLASSIFICATION | BASIC HOURLY RATE (BHR) | FRINGE BENEFITS | TOTAL HOURLY WAGE RATE | LABORERS FRINGE BENEFITS: | | \$ TOTAL WAGE |
| | | | | GROUP # | BHR | |
| Bricklayers | | | \$ | | | \$ |
| Carpenters | | | \$ | | | \$ |
| Cement Masons | | | \$ | | | \$ |
| Drywall Hangers | | | \$ | | | \$ |
| Electricians | | | \$ | | | \$ |
| Iron Workers | | | \$ | | | \$ |
| Painters | | | \$ | OPERATORS FRINGE BENEFITS: | | \$ |
| | | | | GROUP # | BHR | |
| Plumbers | | | \$ | | | \$ |
| Roofers | | | \$ | | | \$ |
| Sheet Metal Workers | | | \$ | | | \$ |
| Soft Floor Layers | | | \$ | | | \$ |
| Tapers | | | \$ | | | \$ |
| Tile Setters | | | \$ | TRUCK DRIVERS FRINGE BENEFITS: | | \$ |
| | | | | GROUP # | BHR | |
| OTHER CLASSIFICATIONS | | | | | | |
| | | | \$ | | | \$ |
| | | | \$ | | | \$ |
| | | | \$ | | | \$ |
| ADDITIONAL CLASSIFICATIONS (HUD Form 4230-A) | | | | | | |
| WORK CLASSIFICATION | BASIC HOURLY RATE | FRINGE BENEFITS | TOTAL HOURLY WAGE RATE | DATE OF HUD SUBMISSION TO DOL | DATE OF DOL APPROVAL | |
| | | | \$ | | | |
| | | | \$ | | | |
| | | | \$ | | | |
| | | | \$ | | | |

Equal Employment Opportunity is **THE LAW**

Private Employers, State and Local Governments, Educational Institutions, Employment Agencies and Labor Organizations

Applicants to and employees of most private employers, state and local governments, educational institutions, employment agencies and labor organizations are protected under Federal law from discrimination on the following bases:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Title VII of the Civil Rights Act of 1964, as amended, protects applicants and employees from discrimination in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment, on the basis of race, color, religion, sex (including pregnancy), or national origin. Religious discrimination includes failing to reasonably accommodate an employee's religious practices where the accommodation does not impose undue hardship.

DISABILITY

Title I and Title V of the Americans with Disabilities Act of 1990, as amended, protect qualified individuals from discrimination on the basis of disability in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship.

AGE

The Age Discrimination in Employment Act of 1967, as amended, protects applicants and employees 40 years of age or older from discrimination based on age in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment.

SEX (WAGES)

In addition to sex discrimination prohibited by Title VII of the Civil Rights Act, as amended, the Equal Pay Act of 1963, as amended, prohibits sex discrimination in the payment of wages to women and men performing substantially equal work, in jobs that require equal skill, effort, and responsibility, under similar working conditions, in the same establishment.

GENETICS

Title II of the Genetic Information Nondiscrimination Act of 2008 protects applicants and employees from discrimination based on genetic information in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. GINA also restricts employers' acquisition of genetic information and strictly limits disclosure of genetic information. Genetic information includes information about genetic tests of applicants, employees, or their family members; the manifestation of diseases or disorders in family members (family medical history); and requests for or receipt of genetic services by applicants, employees, or their family members.

RETALIATION

All of these Federal laws prohibit covered entities from retaliating against a person who files a charge of discrimination, participates in a discrimination proceeding, or otherwise opposes an unlawful employment practice.

WHAT TO DO IF YOU BELIEVE DISCRIMINATION HAS OCCURRED

There are strict time limits for filing charges of employment discrimination. To preserve the ability of EEOC to act on your behalf and to protect your right to file a private lawsuit, should you ultimately need to, you should contact EEOC promptly when discrimination is suspected:

The U.S. Equal Employment Opportunity Commission (EEOC), 1-800-669-4000 (toll-free) or 1-800-669-6820 (toll-free TTY number for individuals with hearing impairments). EEOC field office information is available at www.eeoc.gov or in most telephone directories in the U.S. Government or Federal Government section. Additional information about EEOC, including information about charge filing, is available at www.eeoc.gov.

Employers Holding Federal Contracts or Subcontracts

Applicants to and employees of companies with a Federal government contract or subcontract are protected under Federal law from discrimination on the following bases:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Executive Order 11246, as amended, prohibits job discrimination on the basis of race, color, religion, sex or national origin, and requires affirmative action to ensure equality of opportunity in all aspects of employment.

INDIVIDUALS WITH DISABILITIES

Section 503 of the Rehabilitation Act of 1973, as amended, protects qualified individuals from discrimination on the basis of disability in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment. Disability discrimination includes not making reasonable accommodation to the known physical or mental limitations of an otherwise qualified individual with a disability who is an applicant or employee, barring undue hardship. Section 503 also requires that Federal contractors take affirmative action to employ and advance in employment qualified individuals with disabilities at all levels of employment, including the executive level.

DISABLED, RECENTLY SEPARATED, OTHER PROTECTED, AND ARMED FORCES SERVICE MEDAL VETERANS

The Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, 38 U.S.C. 4212, prohibits job discrimination and requires affirmative action to employ and advance in employment disabled veterans, recently separated veterans (within

three years of discharge or release from active duty), other protected veterans (veterans who served during a war or in a campaign or expedition for which a campaign badge has been authorized), and Armed Forces service medal veterans (veterans who, while on active duty, participated in a U.S. military operation for which an Armed Forces service medal was awarded).

RETALIATION

Retaliation is prohibited against a person who files a complaint of discrimination, participates in an OFCCP proceeding, or otherwise opposes discrimination under these Federal laws.

Any person who believes a contractor has violated its nondiscrimination or affirmative action obligations under the authorities above should contact immediately:

The Office of Federal Contract Compliance Programs (OFCCP), U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210, 1-800-397-6251 (toll-free) or (202) 693-1337 (TTY). OFCCP may also be contacted by e-mail at OFCCP-Public@dol.gov, or by calling an OFCCP regional or district office, listed in most telephone directories under U.S. Government, Department of Labor.

Programs or Activities Receiving Federal Financial Assistance

RACE, COLOR, NATIONAL ORIGIN, SEX

In addition to the protections of Title VII of the Civil Rights Act of 1964, as amended, Title VI of the Civil Rights Act of 1964, as amended, prohibits discrimination on the basis of race, color or national origin in programs or activities receiving Federal financial assistance. Employment discrimination is covered by Title VI if the primary objective of the financial assistance is provision of employment, or where employment discrimination causes or may cause discrimination in providing services under such programs. Title IX of the Education Amendments of 1972 prohibits employment discrimination on the basis of sex in educational programs or activities which receive Federal financial assistance.

INDIVIDUALS WITH DISABILITIES

Section 504 of the Rehabilitation Act of 1973, as amended, prohibits employment discrimination on the basis of disability in any program or activity which receives Federal financial assistance. Discrimination is prohibited in all aspects of employment against persons with disabilities who, with or without reasonable accommodation, can perform the essential functions of the job.

If you believe you have been discriminated against in a program of any institution which receives Federal financial assistance, you should immediately contact the Federal agency providing such assistance.

EMPLOYEE RIGHTS UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.



For additional information:

1-866-4-USWAGE
(1-866-487-9243) TTY: 1-877-889-5627



WWW.WAGEHOUR.DOL.GOV

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)



Rev. Dec. 2008

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

OMB No.: 1235-0008
Expires: 01/31/2015

| NAME OF CONTRACTOR | | OR SUBCONTRACTOR | | ADDRESS | | | | | | | | | | | | | | | | | | |
|--|--|-------------------------------|----|----------------------|-----------------------|--|--|--|--|--|--|-------------------------|-----------------------|----------------------------------|-------------------|--|------|-------------------------|--|---|-------|---------------------|
| PAYROLL NO. | | FOR WEEK ENDING | | PROJECT AND LOCATION | | | | | | | | PROJECT OR CONTRACT NO. | | | | | | | | | | |
| (1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER | (2) NO. OF WITHHOLDING EXEMPTIONS | (3) WORK CLASSIFICATION | OT | OR | (4) DAY AND DATE | | | | | | | (5) TOTAL HOURS | (6) RATE OF PAY | (7) GROSS AMOUNT EARNED | (8) DEDUCTIONS | | | | | (9) NET WAGES PAID FOR WEEK | | |
| | | | | | | | | | | | | | | | | | FICA | WITH- HOLDING TAX | | | OTHER | TOTAL DEDUCTIONS |
| | | | | | HOURS WORKED EACH DAY | | | | | | | | | | | | | | | | | |
| | | | O | | | | | | | | | | | | | | | | | | | |
| | | | S | | | | | | | | | | | | | | | | | | | |
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| | | | S | | | | | | | | | | | | | | | | | | | |
| | | | O | | | | | | | | | | | | | | | | | | | |
| | | | S | | | | | | | | | | | | | | | | | | | |

While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

Date _____

I, _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)

_____;
(Building or Work)

_____ day of _____, _____, and ending the _____ day of _____, _____,
all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

| EXCEPTION (CRAFT) | EXPLANATION |
|-------------------|-------------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

REMARKS:

| | |
|----------------|-----------|
| NAME AND TITLE | SIGNATURE |
|----------------|-----------|

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

Company Letterhead

Payroll Deduction Authorization for "Other Deductions" on Certified Payroll

Project Name: _____

Employee's Name: _____

I, _____ (Employee Name) _____, hereby authorize _____ (name of employer/company) _____ to deduct \$ _____ from my paycheck.

This deduction is for:

_____ Loan Repayment _____ Retirement _____ Profit Sharing _____ Advance
_____ Charitable Donations _____ Savings Bonds _____ Insurance Premiums
_____ Other: _____

This deduction is to be made:

_____ One time only _____ Weekly _____ Monthly _____ times over _____ weeks
_____ Other: _____

Employee's Signature: _____

Date: _____

You may make payroll deductions as permitted by DOL regulations 29 CFR Part 3. These regulations prohibit the employer from requiring employees to "kick-back" (i.e. give up or return to the employer) any of their earnings other than those identified.

You need to submit this documentation only one time per employee, unless changes in deductions or durations take place.

***If deductions are being made for child support, a copy of the court ordered withholding must be included.**

Waiver of Lien

My/our contract with: _____ to

provide _____ for the improvement

to: _____

(Check One)

Partial Conditional

I hereby waive my/our construction lien to the amount \$ _____ for labor/materials provided. This waiver, together with all previous waivers, if any, does not cover amounts due to me/us for the contract improvement provided.

This waiver is conditioned on actual payment of \$ _____.

Partial Unconditional

Having been fully paid and satisfied, hereby waive my/our construction lien to the amount of \$ _____ for the labor/materials provided through _____. This waiver, together with all previous waivers, if any, does/does not cover all amounts due to me/us for contract improvement provided through the date shown above.

Full Conditional

Having been fully paid and satisfied, all my/our construction lien rights against such property are hereby waived and released.

This waiver is conditioned on the actual payment of \$ _____.

Full Unconditional

Having been fully paid and satisfied, all my/our construction lien rights against such property are hereby waived and released.

Date: _____

Signature: _____

Company: _____

Address: _____

Phone: _____

DO NOT SIGN BLANK FORM

FULL UNCONDITIONAL WAIVER

My/our contract with _____ to provide
_____ for the improvement of the property described as

_____ having been
fully paid and satisfied, all my/our construction lien rights against such property
are hereby waived and released.

(Printed Name of Lien Claimant)

(Signature of lien claimant)

Signed on: _____

Address: _____

Telephone: _____

DO NOT SIGN BLANK OR INCOMPLETE FORMS. RETAIN A COPY.

SWORN STATEMENT

State of Michigan

} §

County of Washtenaw

_____, being duly sworn, states the following:

is the (contractor)(subcontractor) for an improvement to the following real property in Washtenaw

County, Michigan, described as follows: _____

The following is a statement of each subcontractor, supplier and laborer, for whom payment of wages or fringe benefits and withholdings is due but unpaid, with whom the **(contractor)(subcontractor)** has (contracted)(subcontracted) for performance under the contract with the owner or lessee, and the amounts due to the persons as of the date of this statement are correctly and fully set forth opposite their names:

| Name, Address & Phone Number of Subcontractor, Supplier, or Laborer | Type of Improvement Furnished | Total Contract Price | Amount Already Paid | Amount Currently Owing | Balance to Complete (optional) | Amount of Laborer Wages Due but Unpaid | Amount of Fringe Benefits and Withholdings Due But Unpaid |
|---|-------------------------------|----------------------|---------------------|------------------------|--------------------------------|--|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Totals | | | | | | | |

(Some columns may not be applicable to all persons listed)

The contractor has not procured material from, or subcontracted with, any person other than those set forth and owes no money for the improvement other than the sums set forth.*

I make this statement as the (contractor)(subcontractor) or as of the (contractor)(sub-contractor) to represent to the owner or lessee of the property and his or her agents that the property is free from claims of construction liens, or the possibility of construction liens, except as specifically set forth in this statement and except for claims of construction liens by laborers that may be provided under Section 109 of the Construction Lien Act, 1980 PA 497, MCL 570.1 109.

WARNING TO OWNER OR LESSEE: AN OWNER OR LESSEE OF THE PROPERTY MAY NOT RELY ON THIS SWORN STATEMENT TO AVOID THE CLAIM OF A SUBCONTRACTOR, SUPPLIER OR LABORER WHO HAS PROVIDED A NOTICE OF FURNISHING OR A LABORER WHO MAY PROVIDE A NOTICE OF FURNISHING UNDER SECTION 109 OF THE CONSTRUCTION LIEN ACT, 1980 PA 497, MCL 570.1109 TO THE DESIGNEE OR TO THE OWNER OR LESSEE IF THE DESIGNEE IS NOT NAMED OR HAS DIED.

IF THIS SWORN STATEMENT IS IN REGARD TO A RESIDENTIAL STRUCTURE, ON RECEIPT OF THIS SWORN STATEMENT, THE OWNER OR LESSEE, OR THE OWNER'S OR LESSEE'S DESIGNEE MUST GIVE NOTICE OF ITS RECEIPT, EITHER IN WRITING, OR BY TELEPHONE, OR PERSONALLY. TO EACH SUBCONTRACTOR, SUPPLIER, AND LABORER WHO HAS PROVIDED A NOTICE OF FURNISHING UNDER SECTION 109 OR, IF A NOTICE OF FURNISHING IS EXCUSED UNDER SECTION 108 OR 108A, TO EACH SUBCONTRACTOR, SUPPLIER, AND LABORER NAMED IN THE SWORN STATEMENT. IF A SUBCONTRACTOR, SUPPLIER WHO HAS PROVIDED LESSEE, OR DESIGNEE SHALL PROVIDE THE REQUESTER A COPY OF THE SWORN STATEMENT WITHIN 10 BUSINESS DAYS AFTER RECEIVING THE REQUEST.

Dependent Printed Name

Dependent Signature

WARNING TO DEPENDENT: A PERSON WHO GIVES A FALSE SWORN STATEMENT WITH INTENT TO FRAUD IS SUBJECT TO CRIMINAL PENALTIES AS PROVIDED IN SECTION 110 OF THE CONSTRUCTION LIEN ACT, 1980 PA 497, MCL 570.1110.

Subscribed and sworn to before me this

_____ day of _____, _____

Notary Public, _____ County, Michigan

My Commission Expires:

*Materials furnished by a contractor or a subcontractor out of his or her own inventory, and which has not been purchased specifically for the purpose of performing the contract, need not be listed.

Part II: Contracts Awarded

1. Construction Contracts:

| | |
|---|----|
| A. Total dollar amount of all contracts awarded on the project | \$ |
| B. Total dollar amount of contracts awarded to Section 3 businesses | \$ |
| C. Percentage of the total dollar amount that was awarded to Section 3 businesses | % |
| D. Total number of Section 3 businesses receiving contracts | |

2. Non-Construction Contracts:

| | |
|---|----|
| A. Total dollar amount all non-construction contracts awarded on the project/activity | \$ |
| B. Total dollar amount of non-construction contracts awarded to Section 3 businesses | \$ |
| C. Percentage of the total dollar amount that was awarded to Section 3 businesses | % |
| D. Total number of Section 3 businesses receiving non-construction contracts | |

Part III: Summary

Indicate the efforts made to direct the employment and other economic opportunities generated by HUD financial assistance for housing and community development programs, to the greatest extent feasible, toward low- and very low-income persons, particularly those who are recipients of government assistance for housing. (Check all that apply.)

- Attempted to recruit low-income residents through: local advertising media, signs prominently displayed at the project site, contracts with the community organizations and public or private agencies operating within the metropolitan area (or nonmetropolitan county) in which the Section 3 covered program or project is located, or similar methods.
- Participated in a HUD program or other program which promotes the training or employment of Section 3 residents.
- Participated in a HUD program or other program which promotes the award of contracts to business concerns which meet the definition of Section 3 business concerns.
- Coordinated with Youthbuild Programs administered in the metropolitan area in which the Section 3 covered project is located.
- Other; describe below.

Public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This agency may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB number.

Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u, mandates that the Department ensures that employment and other economic opportunities generated by its housing and community development assistance programs are directed toward low- and very-low income persons, particularly those who are recipients of government assistance housing. The regulations are found at 24 CFR Part 135. The information will be used by the Department to monitor program recipients' compliance with Section 3, to assess the results of the Department's efforts to meet the statutory objectives of Section 3, to prepare reports to Congress, and by recipients as self-monitoring tool. The data is entered into a database and will be analyzed and distributed. The collection of information involves recipients receiving Federal financial assistance for housing and community development programs covered by Section 3. The information will be collected annually to assist HUD in meeting its reporting requirements under Section 808(e)(6) of the Fair Housing Act and Section 916 of the HCDA of 1992. An assurance of confidentiality is not applicable to this form. The Privacy Act of 1974 and OMB Circular A-108 are not applicable. The reporting requirements do not contain sensitive questions. Data is cumulative; personal identifying information is not included.

Form HUD-60002, **Section 3 Summary Report, Economic Opportunities for Low- and Very Low-Income Persons.**

Instructions: This form is to be used to report annual accomplishments regarding employment and other economic opportunities provided to low- and very low-income persons under Section 3 of the Housing and Urban Development Act of 1968. The Section 3 regulations apply to any **public and Indian housing programs** that receive: (1) development assistance pursuant to Section 5 of the U.S. Housing Act of 1937; (2) operating assistance pursuant to Section 9 of the U.S. Housing Act of 1937; or (3) modernization grants pursuant to Section 14 of the U.S. Housing Act of 1937 and to **recipients of housing and community development assistance in excess of \$200,000** expended for: (1) housing rehabilitation (including reduction and abatement of lead-based paint hazards); (2) housing construction; or (3) other public construction projects; and to **contracts and subcontracts in excess of \$100,000** awarded in connection with the Section-3-covered activity.

Form HUD-60002 has three parts, which are to be completed for all programs covered by Section 3. Part I relates to **employment and training**. The recipient has the option to determine numerical employment/training goals either on the basis of the number of hours worked by new hires (columns B, D, E and F). Part II of the form relates to **contracting**, and Part III summarizes recipients' **efforts** to comply with Section 3.

Recipients or contractors subject to Section 3 requirements must maintain appropriate documentation to establish that HUD financial assistance for housing and community development programs were directed toward low- and very low-income persons.* A recipient of Section 3 covered assistance shall submit one copy of this report to HUD Headquarters, Office of Fair Housing and Equal Opportunity. Where the program providing assistance requires an annual performance report, this Section 3 report is to be submitted at the same time the program performance report is submitted. Where an annual performance report is not required, this Section 3 report is to be submitted by January 10 and, if the project ends before December 31, within 10 days of project completion. **Only Prime Recipients are required to report to HUD. The report must include accomplishments of all recipients and their Section 3 covered contractors and subcontractors.**

- HUD Field Office: Enter the Field Office name .
1. Recipient: Enter the name and address of the recipient submitting this report.
 2. Federal Identification: Enter the number that appears on the award form (with dashes). The award may be a grant, cooperative agreement or contract.
 3. Dollar Amount of Award: Enter the dollar amount, rounded to the nearest dollar, received by the recipient.
 - 4 & 5. Contact Person/Phone: Enter the name and telephone number of the person with knowledge of the award and the recipient's implementation of Section 3.
 6. Reporting Period: Indicate the time period (months and year) this report covers.
 7. Date Report Submitted: Enter the appropriate date.

8. Program Code: Enter the appropriate program code as listed at the bottom of the page.
9. Program Name: Enter the name of HUD Program corresponding with the "Program Code" in number 8.

Part I: Employment and Training Opportunities

Column A: Contains various job categories. Professionals are defined as people who have special knowledge of an occupation (i.e. supervisors, architects, surveyors, planners, and computer programmers). For construction positions, list each trade and provide data in columns B through F for each trade where persons were employed. The category of "Other" includes occupations such as service workers.

Column B: (Mandatory Field) Enter the number of new hires for each category of workers identified in **Column A** in connection with this award. New hire refers to a person who is not on the contractor's or recipient's payroll for employment at the time of selection for the Section 3 covered award or at the time of receipt of Section 3 covered assistance.

Column C: (Mandatory Field) Enter the number of Section 3 new hires for each category of workers identified in **Column A** in connection with this award. Section 3 new hire refers to a Section 3 resident who is not on the contractor's or recipient's payroll for employment at the time of selection for the Section 3 covered award or at the time of receipt of Section 3 covered assistance.

Column D: Enter the percentage of all the staff hours of new hires (Section 3 residents) in connection with this award.

Column E: Enter the percentage of the total staff hours worked for Section 3 employees and trainees (including new hires) connected with this award. Include staff hours for part-time and full-time positions.

Column F: (Mandatory Field) Enter the number of Section 3 residents that were trained in connection with this award.

Part II: Contract Opportunities

Block 1: Construction Contracts

Item A: Enter the total dollar amount of all contracts awarded on the project/program.

Item B: Enter the total dollar amount of contracts connected with this project/program that were awarded to Section 3 businesses.

Item C: Enter the percentage of the total dollar amount of contracts connected with this project/program awarded to Section 3 businesses.

Item D: Enter the number of Section 3 businesses receiving awards.

Block 2: Non-Construction Contracts

Item A: Enter the total dollar amount of all contracts awarded on the project/program.

Item B: Enter the total dollar amount of contracts connected with this project awarded to Section 3 businesses.

Item C: Enter the percentage of the total dollar amount of contracts connected with this project/program awarded to Section 3 businesses.

Item D: Enter the number of Section 3 businesses receiving awards.

Part III: Summary of Efforts – Self -explanatory

Submit one (1) copy of this report to the HUD Headquarters Office of Fair Housing and Equal Opportunity, at the same time the performance report is submitted to the program office. The Section 3 report is submitted by January 10. Include only contracts executed during the period specified in item 8. PHAs/IHAs are to report all contracts/subcontracts.

* The terms "low-income persons" and very low-income persons" have the same meanings given the terms in section 3 (b) (2) of the United States Housing Act of 1937. **Low-income persons** mean families (including single persons) whose incomes do not exceed 80 percent of the median income for the area, as determined by the Secretary, with adjustments for smaller and larger families, except that

The Secretary may establish income ceilings higher or lower than 80 percent of the median for the area on the basis of the Secretary's findings such that variations are necessary because of prevailing levels of construction costs or unusually high- or low-income families. **Very low-income persons** mean low-income families (including single persons) whose incomes do not exceed 50 percent of the median family income area, as determined by the Secretary with adjustments or smaller and larger families, except that the Secretary may establish income ceilings higher or lower than 50 percent of the median for the area on the basis of the Secretary's findings that such variations are necessary because of unusually high or low family incomes.

Project Wage Decision

General Decision Number: MI170100 02/24/2017 MI100

Superseded General Decision Number: MI20160100

State: Michigan

Construction Type: Building

County: Washtenaw County in Michigan.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

| Modification Number | Publication Date |
|---------------------|------------------|
| 0 | 01/06/2017 |
| 1 | 01/20/2017 |
| 2 | 02/03/2017 |
| 3 | 02/24/2017 |

ASBE0025-003 06/01/2016

Townships of Ann Arbor, Augusta, Lodi, Northfield, Pittsfield, Salem, Saline, Scio, Superior, Webster, Ypsilanti & York

| | Rates | Fringes |
|---|----------|---------|
| ASBESTOS WORKER/HEAT & FROST INSULATOR..... | \$ 31.51 | 31.04 |

ASBE0047-001 07/01/2016

Townships of Bridgewater, Dexter, Freedom, Lims, Lyndon, Manchester, Sharon & Sylvan

| | Rates | Fringes |
|--|----------|---------|
| ASBESTOS WORKER/HEAT & FROST INSULATOR..... | \$ 30.22 | 16.48 |
| ----- | | |
| BOIL0169-001 01/01/2014 | | |
| | Rates | Fringes |
| BOILERMAKER..... | \$ 32.78 | 28.39 |
| ----- | | |
| BRMI0009-010 08/01/2016 | | |
| | Rates | Fringes |
| BRICKLAYER..... | \$ 33.70 | 20.37 |
| TILE FINISHER..... | \$ 26.65 | 18.21 |
| TILE SETTER..... | \$ 33.00 | 18.21 |
| ----- | | |
| CARP0687-001 06/01/2016 | | |
| | Rates | Fringes |
| CARPENTER, Includes Drywall Hanging, Form Work, and Metal Stud Installation..... | \$ 31.16 | 26.56 |
| ----- | | |
| CARP1045-001 06/01/2016 | | |
| | Rates | Fringes |
| CARPENTER (Floor Layer - Carpet, Resilient, & Vinyl Flooring)..... | \$ 28.00 | 23.02 |
| ----- | | |
| CARP1102-002 06/01/2013 | | |
| | Rates | Fringes |
| MILLWRIGHT..... | \$ 31.11 | 28.64 |
| ----- | | |
| ELEC0252-010 06/14/2016 | | |
| | Rates | Fringes |
| ELECTRICIAN..... | \$ 34.58 | 25.22 |
| ----- | | |

ENGI0324-017 06/01/2016

| | Rates | Fringes |
|---------------------------|----------|---------|
| OPERATOR: Power Equipment | | |
| GROUP 1..... | \$ 39.64 | 22.90 |
| GROUP 2..... | \$ 38.14 | 22.90 |
| GROUP 3..... | \$ 36.64 | 22.90 |
| GROUP 4..... | \$ 36.34 | 22.90 |
| GROUP 5..... | \$ 35.52 | 22.90 |
| GROUP 6..... | \$ 34.66 | 22.90 |
| GROUP 7..... | \$ 33.69 | 22.90 |
| GROUP 8..... | \$ 31.98 | 22.90 |
| GROUP 9..... | \$ 23.64 | 22.90 |

FOOTNOTES:

Tower cranes: to be paid the crane operator rate determined by the combined length of the mast and the boom. If the worker must climb 50 ft. or more to the work station, \$.25 per hour additional.

Derrick and cranes where the operator must climb 50 ft. or more to the work station, \$.25 per hour additional to the applicable crane operator rate.

POWER EQUIPMENT OPERATOR CLASSIFICATIONS

GROUP 1: Crane with boom and jib or leads 400' or longer

GROUP 2: Crane with boom and jib or leads 300' or longer

GROUP 3: Crane with boom and jib or leads 220' or longer

GROUP 4: Crane with boom and jib or leads 140' or longer

GROUP 5: Crane with boom and jib or leads 120' or longer

GROUP 6: Regular crane operator, and concrete pump with boom operator

GROUP 7: Backhoe/Excavator/Trackhoe, bobcat/skid Loader, broom/sweeper, bulldozer, grader/blade, highlift, hoist, loader, roller, scraper, tractor & trencher

GROUP 8: Forklift & extend-a-boom forklift

GROUP 9: Oiler

IRON0025-019 06/01/2015

| | Rates | Fringes |
|------------------|----------|---------|
| IRONWORKER | | |
| REINFORCING..... | \$ 28.30 | 24.60 |
| STRUCTURAL..... | \$ 33.78 | 27.84 |

LABO0334-005 06/01/2015

| | Rates | Fringes |
|---------------------------------|----------|---------|
| LABORER: Landscape & Irrigation | | |
| GROUP 1..... | \$ 19.76 | 9.15 |
| GROUP 2..... | \$ 15.54 | 9.15 |

CLASSIFICATIONS

GROUP 1: Landscape specialist, including air, gas and diesel equipment operator, lawn sprinkler installer, skidsteer (or equivalent)

GROUP 2: Landscape laborer: small power tool operator, material mover, truck driver and lawn sprinkler installer tender

LABO0499-005 08/01/2014

| | Rates | Fringes |
|---|----------|---------|
| LABORER | | |
| Common or General; Grade Checker; Sandblaster..... | \$ 28.32 | 13.85 |
| Mason Tender - Brick; Mason Tender - Cement/Concrete..... | \$ 28.52 | 13.85 |
| Pipelayer..... | \$ 28.64 | 13.85 |

PAIN0022-003 06/01/2015

| | Rates | Fringes |
|--|----------|---------|
| PAINTER: Brush and Roller..... | \$ 26.06 | 17.66 |
| PAINTER: Drywall Finishing/Taping..... | \$ 27.05 | 18.26 |
| PAINTER: Spray..... | \$ 26.86 | 17.66 |

PAIN0357-002 06/01/2015

| | Rates | Fringes |
|--------------|----------|---------|
| GLAZIER..... | \$ 30.05 | 18.10 |

PAID HOLIDAYS: New Year's Day, Decoration Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day; provided that the employee has worked the last full regular scheduled work day prior to the holiday, and the first full regular scheduled work day following the holiday, provided the employee is physically able to work.

 PLAS0514-006 05/01/2016

| | Rates | Fringes |
|-----------------------------------|----------|---------|
| CEMENT MASON/CONCRETE FINISHER... | \$ 31.55 | 14.80 |

 PLUM0190-004 06/01/2016

| | Rates | Fringes |
|--|----------|---------|
| PIPEFITTER (Including HVAC Pipe Installation; Excluding HVAC System Installation)..... | \$ 38.99 | 21.06 |
| PLUMBER, Excludes HVAC Pipe and Unit Installation..... | \$ 38.99 | 21.06 |

 ROOF0070-001 06/01/2016

| | Rates | Fringes |
|-------------|----------|---------|
| ROOFER..... | \$ 31.37 | 15.98 |

 SFMI0704-001 01/01/2017

| | Rates | Fringes |
|---|----------|---------|
| SPRINKLER FITTER (Fire Sprinklers)..... | \$ 43.25 | 22.42 |

 SHEE0080-001 07/01/2015

| | Rates | Fringes |
|---|-------|---------|
| SHEET METAL WORKER, Includes HVAC Duct and Unit | | |

Installation.....\$ 37.24 26.56

* TEAM0247-001 06/01/2016

| | Rates | Fringes |
|-------------------------------------|----------|---------|
| TRUCK DRIVER | | |
| GROUP 1 | | |
| Flatbed; Pickup; Dump & Tandem..... | \$ 25.94 | 0.60+a |
| GROUP 2 | | |
| Semi..... | \$ 26.09 | 0.60+a |
| GROUP 3 | | |
| Lowboy..... | \$ 26.19 | 0.60+a |

PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If any of the above holidays fall on a Sunday, the following Monday shall be considered the holiday and, if work is performed, the rate shall be double time.

FOOTNOTE:

a. \$418.45 per week, plus \$62.00 per day.

SUMI2011-025 02/01/2011

| | Rates | Fringes |
|-----------------------------|----------|---------|
| IRONWORKER, ORNAMENTAL..... | \$ 18.48 | 7.93 |
| TRUCK DRIVER: Tractor Haul | | |
| Truck..... | \$ 13.57 | 1.18 |

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including

preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

