MOORE PUBLIC SCHOOLS
CHILD CARE FACILITY

INDEPENDENT DISTRICT NO. 2
CLEVELAND COUNTY, MOORE, OKLAHOMA

201 NORTH EASTERN AVENUE
MOORE, OKLAHOMA 73160

PROJECT MANUAL

OCTOBER 2024

AGP | the Abla Griffin Partnership

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CHILD CARE CENTER

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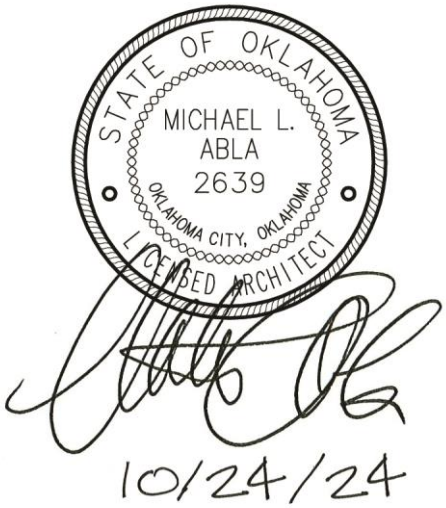

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Mechanical Engineer
Salas O'Brien, LLC
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CA 7058/ EXP 06.30.2025

Engineer of Record
Division 26
Timothy Van Ostran
Electrical Engineer
Salas O'Brien, LLC
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SPECIAL CONDITIONS

TIME FOR COMPLETION AND LIQUIDATED DAMAGES:

A. Upon execution of the contract agreement between the Owner and the Contractor, it shall become an obligation of the contractor to complete all work to be performed under this agreement for the Construction of the Moore Public Schools – Child Care Center renovation located at 201 North Eastern Ave., Moore, OK - **within 210 Calendar Days.**

B. Penalty for noncompliance by the above date shall be cessation of all further periodical payments until the work is completed and can be fully used for the purpose intended.

PAYMENTS:

A. The Owner's payment schedule indicating the payment dates established by Moore Public Schools shall be provided to the contractor to establish a monthly payment schedule.

B. **Certificates of payment shall be submitted to the Architect on or before 7 days prior to Owner's cut-off date.**

C. Until the Work is 50 percent complete, the Owner will pay 95 percent of the amount due the Contractor on account of progress payments. At the time the Work is 50 percent complete, any **remaining** partial payments shall be paid at 97.5 percent of amount due. The retainage shall be retained until the project is completed.

INSURANCE AND BONDS:

A. Insurance provided shall be with a company or companies licensed to do business in the state of Oklahoma.

B. Policies shall be provided in the following types and amounts:

1. a. Workmen's Compensation-Statutory
   b. Employer's Liability-$500,000 each accident.

2. Comprehensive General Liability:
   a. Bodily Injury - $1,000,000 each occurrence.
   b. Personal Injury - $1,000,000
   c. Property Damage - $1,000,000 each occurrence.

3. Automobile Liability:
   a. Bodily Injury - $500,000 each person/$1,000,000 each occurrence.

b. Such Comprehensive Automobile Liability Insurance shall include all owned and non-owned hired motor vehicles.

4. Owner's Protective Liability - Same limits as above.

5. Products and Completed Operations - Same limits as above.

6. Contractual Liability - Same limits as above.

C. Furnish one copy of Certificates herein required for each copy of the Agreement; specifically set forth evidence of all coverage required by Subparagraphs 11.1 and 11.2. Furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits.

D. T**he Contractor shall provide property insurance in the amount of the initial contract sum as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis without voluntary deductibles. This insurance coverage shall be the "all-risk" form for completed value.**

TEMPORARY SERVICES:

A. Sanitary Facilities: The Contractor shall provide and maintain necessary sanitary conveniences for the use of those employed on/or about the work. The sanitary facilities shall be properly secluded from public observation and shall be such locations as shall be approved by the Owner, and their use shall be strictly enforced.

SHOP DRAWINGS and SUBMITTALS:

A. Unless otherwise specified, the shop drawings and product data shall be submitted **electronically**. Physical samples of materials shall be submitted to the Architect as required.

B. Construction Manager is responsible for obtaining and distributing required prints of shop drawings to his subcontractors and material suppliers after as well as before final approval.

C. Prior to forwarding all submittals – including shop drawings and samples - to the Architect, the Construction Manager is responsible for reviewing submitted materials in their entirety

and making necessary revisions/comments/corrections, etc. to the submittals.

D. Shop drawings and samples shall be dated and marked to show the names of the Project, Architect, CM, originating Sub-Contractor, manufacturer or supplier, and separate detailer if pertinent. Shop drawings shall completely identify Specifications section and locations at which materials or equipment are to be installed. Reproduction of Contract Drawings are acceptable as Shop Drawings only when specifically authorized in writing by the Architect.

E. If materials or specified items other than those specified in these Contract Documents are supplied - and approved by the Architect - it shall be the Construction Manager's responsibility to provide ALL additional materials, accessories, substrates, utility connection, etc. for a complete and operational installation at NO additional cost to the Owner.

CHANGES IN THE WORK:

A. Cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits under collective bargaining agreements; workmen's compensation insurance; bond premiums; and rental value of power tools and equipment. Overhead shall include the following; supervision, superintendence, wages of timekeepers, watchmen and clerks, hand tools, incidentals, general office expense, and all other expenses not included in "cost".

B. Change Order markups shall be limited to 10% overhead and 10% profit. No other markups shall be allowed.

AS BUILT DRAWINGS:

A. Provide and maintain in proper order and in good, clean condition in the field office at the project site, one complete full-size set of all working drawings. On this set of drawing prints, in red ink, neatly and accurately inscribe any and all changes in the work.

B. Upon completion of work, the Contractor shall furnish one set of **"as built"** drawings. These drawings shall be contract drawings corrected in **red ink** to show any differences between contract

drawings and actual construction. All changes made during construction shall be noted. Each drawing showing changes in dimensions, details, or containing supplemental information shall be plainly marked **"As Built"** and shall contain the signature of both the Architect and the Contractor.

CLOSEOUT SUBMITTALS:

Prepare project data in the form of an instructional manual supplied electronically on media as requested by Owner (CD or flash drive). The following information shall be included and arranged under a Table of Contents:

1. Directory listing names, addresses, and telephone numbers of the Architect/Engineer(s), General Contractor, Subcontractors, and major material/equipment suppliers.
2. Operation and Maintenance Instructions arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and Suppliers. Include equipment, parts list for each, operating instructions, maintenance instructions for equipment, special finishes, etc.
3. Project documents and certificates, including shop drawings and product data, air and water balance reports, photocopies of warranties.
4. Record As-Built Drawings as described above.
5. Completed Non-Asbestos Affidavit.

DEBRIS DISPOSAL:

Waste disposal shall be the responsibility of the Contractor. The Contractor shall make arrangements with the local authorities having jurisdiction for accommodation of all waste disposal. If local facilities are not available, the contractor shall be responsible for all other arrangements for waste disposal.

SUPPLEMENTARY CONDITIONS AND SPECIAL CONDITIONS:

In the following sections where the term "General Conditions" is used, it shall include the "Supplementary Conditions" and/or "Special Conditions" bound in this project manual.

MISCELLANEOUS PROVISIONS:

A. TESTS AND INSPECTIONS

Add the following clarification: **Regardless of how it is**

described elsewhere in the drawings and specifications, the CM shall engage all testing laboratories / subcontractors as approved by the Architect; and, pay for ALL testing as required by the drawings and specifications. The CM shall pay for any additional testing due to defective work. The Owner shall pay for any additional testing requested and found to be non-defective.

B. EQUAL OPPORTUNITY

The Contractor shall maintain policies of employment as follows:

The Construction Manager and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated fairly during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment advertising; layoff or termination; rates of pay or any other forms of compensation; and selection for training, including apprenticeship. The CM agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.

C. COOPERATION WITH BUILDING OFFICIALS

Cooperate with applicable Federal, State, City or other governmental officials and inspectors at all times. If such officials or inspectors deem special inspections are necessary, provide assistance and facilities that will expedite their inspection.

Construction Manager shall be responsible for obtaining and paying for ALL building permits required for this project. This cost shall be included in the Construction Manager's General Conditions.

D. MEASUREMENTS

Before doing any work or ordering any materials, the Contractor shall verify all measurements of existing and new work and shall be responsible for their correctness.

Any differences which may be found shall be submitted to

the Architect for consideration before proceeding with the work. No extra compensation will be allowed because of differences between actual dimensions and measurements indicated on the working drawings.

E. MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS

Install all manufactured items of materials or equipment in strict accordance with manufacturer's recommended specifications, except that the specifications herein, where more stringent, shall be complied with.

At the completion of the project and prior to final acceptance by the Owner, provide the Owner with three complete sets of operating and maintenance instructions, and demonstrate to him the procedures for proper operation and maintenance of all equipment.

F. JOB MAINTENANCE

During the course of their work, all crafts and trades shall protect all work which preceded theirs from damage, and they shall make repairs or replacements to any damage caused either directly or indirectly by them.

G. COMPLIANCE WITH STATE AND FEDERAL LAWS

Construction Manager assumes full responsibility for the payment of all contributions and payroll taxes (state and federal) as to all subcontractors and employees engaged in the performance of work pursuant hereto and further agrees to check and meet all requirements that might be specified under regulations of the administrative officials or board charged with the enforcement of any state or federal act on the subject referred. CM agrees to furnish Owner, upon request, a certificate or other evidence of compliance therewith.

H. OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (OSHA)

The Construction Manager shall comply with the latest edition and revision of The Federal Occupational Safety and Health Act of 1970 for construction.

I. GUARANTY BONDS

1. Prior to the Owner signing the contract agreement, he

will require the Construction Manager to furnish performance and payment bonds covering the faithful performance of the entire construction contract agreement. The performance bond and the payment bond shall each be made out in one hundred percent (100%) of the contract sum and shall be in a company or companies against which the Owner has no reasonable objection.

2. Bonds shall be signed by an official of the bonding company and shall be accompanied by the bonding agent's written power-of-attorney in order that one copy may be attached to each copy of the contract agreement.

3. The Construction Manager shall include in his proposal amount the total premiums for all required bonds.

4. The Contractor does hereby warrant and/or guarantee against defects in all workmanship and materials performed or furnished by him directly or by his subcontractors for a period of one (1) year from the date of completion, as evidenced by the date of the Final Certificate or final acceptance of the project. Said warranty and/or guarantee shall be in the form of a good and sufficient bond in a sum equal to one hundred percent (100%) of the contract price.

End of Special Conditions

SECTION 01010-SUMMARY OF THE WORK

Part 1 - General

1.01 Work Included:

A. The General Conditions, Bidding Requirements, and Division I are hereby made a part of each of the technical sections that follow, and shall be understood to apply and shall apply in full to all individuals or corporations who contract or subcontract to perform any part or all of the project work.

B. Indications on the working drawings or in any section of the specifications of an article or material, operation, or method, requires that the Contractor shall provide each item or service or quality or is subject to qualifications noted; and, the Contractor shall perform each operation prescribed according to the conditions stated providing, therefore, all necessary labor, equipment and incidentals to complete the project work.

C. The project:

1. Name: Moore Public Schools – Child Care Center.
2. Location: 201 North Eastern Ave. – Moore, Oklahoma.

1.02 Summary of Work:

A. **Base Bid:** Provide and pay for all materials, labor, services, equipment, licenses, taxes, permits, and other items necessary for the complete construction of an (approximately) 33,750 s.f. child care center interior and exterior renovation including new outdoor play area, sidewalks, paving, and site utilities. Contractor shall maintain all barriers, guards and other environmental items required at the site during construction.

B. Owner: Moore Public Schools

1. Owner's Representative:
   Jeff Horn, Bond Issue Consultant
   Moore Public Schools
   1500 SE 4th Street
   Moore, OK 73160
   405-735-4221

C. Design Team:

1. Architect:
   Mike Abla, Principal Architect
   AGP
   313 SE 5th Street
   Moore, OK 73160
   405-735-3477
2. Structural Engineer:
   Brandon Birch, Structural Engineer
   KFC Engineering, Inc.
   205 NW 63rd, Suite 390
   Oklahoma City, OK 73116
3. Mechanical, Electrical and Plumbing Engineers:
   Dwayne Gordon, Mechanical Engineer
   Salas O'Brien LLC
   2900 S. Telephone Rd., Suite 120
   Moore, OK 73160
   405-364-9926

4. Civil Engineer:
   Derek Harris, Engineering Intern
   Cedar Creek
   P.O. Box 14534
   Oklahoma City, OK 73113
   405-863-8984
4. Construction Manager:
   Joe Sherga, Project Manager
   Omni Construction LLC
   1909 S. Eastern Ave.
   Moore, OK 73160
   405-735-3992

1.04 Work to be Provided and Installed By Others:
Not applicable.

1.05 Use of the Site:
A. Confine operations at the site to the areas permitted under the contract. Portions of the site beyond areas on which work is indicated are not to be disturbed.
B. Keep facility free from accumulation of waste material, rubbish or construction debris.

1.06 Safety of Persons and property:
A. Contractor is responsible for ALL means and methods required for the protection of the existing building being added on to and shall replace/repair any damage to said building that occurs during construction of the new addition.
B. Contractor shall at all times protect the building from damage from rainwater.
C. Contractor shall provide barricades and clearly mark work zone areas.
D. Refer to Special Conditions "Temporary Services" for additional information.
E. During the period of construction, the OSHA Standards shall be followed as applicable by law.
F. The Contractor shall post emergency telephone numbers.

1.07 Preconstruction Conference:
A. A preconstruction meeting will be held at a time and place designated by the Architect or Owner's Representative, for the purpose of identifying responsibilities of the Owner's and the Architect's personnel and explanation of administrative procedures.
B. The Contractor shall use this meeting for the following minimum agenda:
   1. Construction Schedule/Project Phasing.
   2. Use of areas of the site.
   3. Delivery and storage.
   4. Safety.
   5. Security.
   6. Cleaning up.
   7. Subcontractor procedures relating to:
      a. Submittals.
      b. Change orders.
      c. Applications for payment.

d. Record documents.

C. The attendees shall include:
1. The Owner's Representatives.
2. The Architect.
3. The Contractor and its superintendent.

1.08 Project Scheduling:

A. The Contractor is responsible for the scheduling of construction and must prepare a schedule and charting system described below. This schedule is to ensure adequate planning and execution of the work by the contractor and to assist the Architect in appraising the schedule and evaluating the progress of the work.

B. The project schedule shall be presented within ten (10) days after receipt of the Notice to Proceed. Electronic copies of the schedule shall be submitted to the Architect for review and approval.

C. The schedule logic must be in the form of a "fenced" bar chart or Critical Path Method network indicating the planned start and completion dates of the activity, logical constraints between activities, and total float of each activity.

D. An updated project schedule shall be provided when requested by the Architect.

1.09 Environmental Controls:

A. Water Resources:
1. Oily substances: prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water.
2. Mosquito abatement: prevent ponding of stagnant water conducive to mosquito breeding habitat.

B. Land Resources:
1. Erodible soils: plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas in reasonably sized increments only as needed to use the areas developed. Immediately protect side slopes and back slopes upon completion of rough grading.

C. Air resources:
1. Prevent creation of dust, air pollution, and odors.
2. Use water sprinkling, temporary enclosures, and other appropriate methods to limit dust and dirt rising and scattering in air to locate practical level.
3. Store volatile liquids, including fuels and solvents, in closed containers.
4. Properly maintain equipment to reduce gaseous pollutant emissions.

D. Comply with all applicable environmental control guidelines as required by the City of Oklahoma City.

1.10 Temporary Utilities:

A. The Contractor shall provide and pay for all temporary utilities required for the complete construction of the project including, but not limited to, electricity, lighting, heating, cooling, ventilating, telephone, water, sanitary facilities, exterior and interior enclosures, access roads and parking

areas, cleaning and waste removal, project identification and signs, etc.

1.11 Cleaning:

A. Use cleaning materials and agents recommended by manufacturer or fabricator of surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property, or that might damage finished surfaces.

B. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's published instructions.

C. Complete cleaning operations prior to requesting a Final / Substantial Completion Inspection.

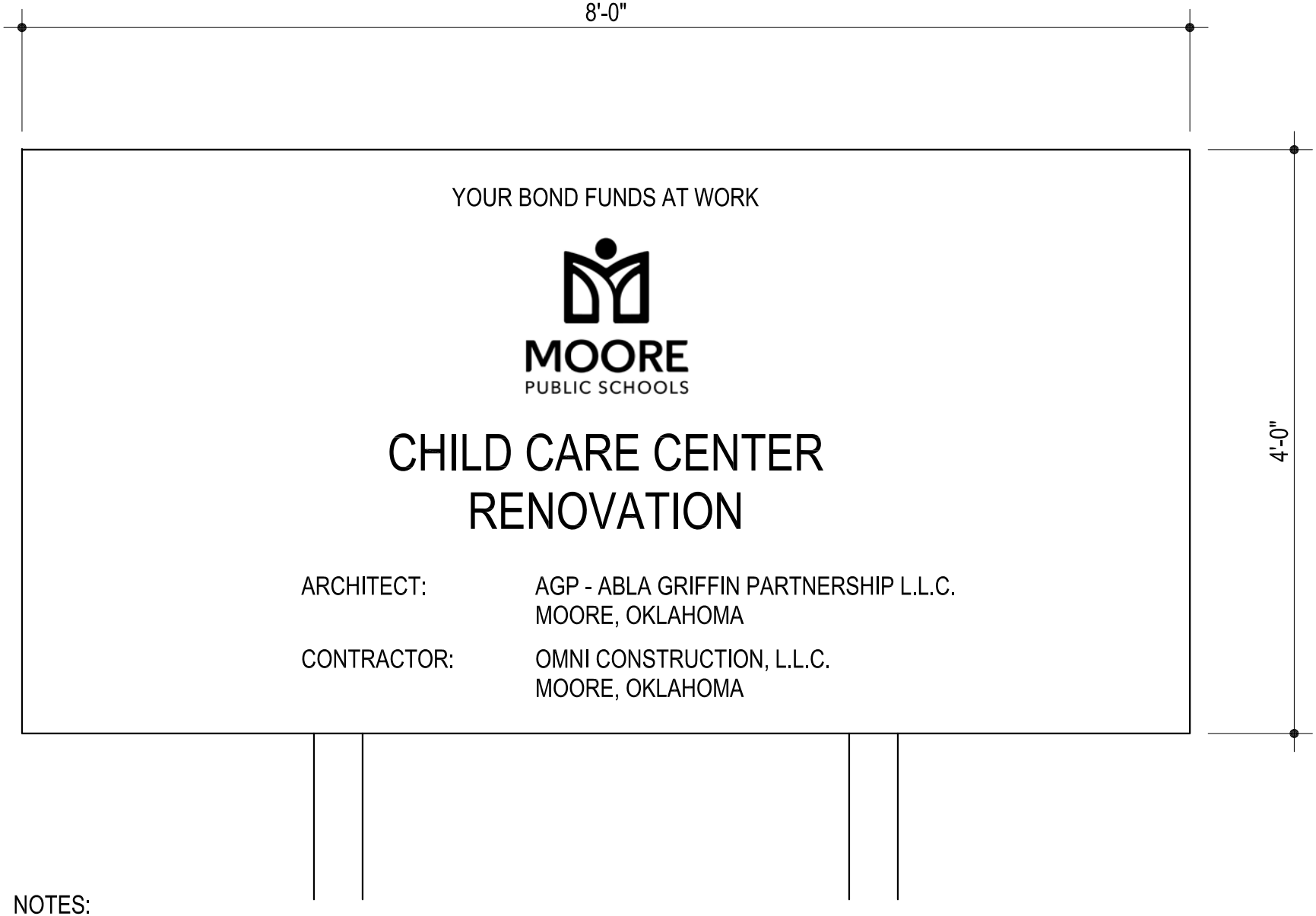
1.12 Project Sign:

A. Provide and install painted plywood project sign on wooden posts securely erected at the project site in a location approved by the Owner.

B. No other project signs or advertisement shall be allowed at the project site unless approved by the Owner.

C. Graphics and form of letter of the project sign shall be as indicated in the attached detail.

End of Section



NOTES:

1. WHITE LETTERS ON DARK BLUE BACKGROUND
2. 3/4" EXTERIOR PLYWOOD - PAINTED ALL SIDES
3. MOUNT ON 4" X 4" WOOD POST
4. CONTRACTOR TO HAVE LAYOUT APPROVED PRIOR TO INSTALLATION

DIVISION 2 - SITE WORK

SECTION 02050 - DEMOLITION

Part 1 - General

1.01 Work Included:

A. The General Conditions and applicable sections of Division 1 shall apply to this entire section.

B. All materials, labor, services and incidentals necessary for the completion of this section of the work.

C. Complete demolition of the existing paving and curbs as indicated on the drawings; and all other site materials as shown on the Drawings.

D. Removal of all materials, debris and rubbish from site. Refer to Part 3 for ownership of materials.

1.02 Submittals:

A. Scheduling of Alteration and Demolition Work:

1. Before commencing any alteration removal or demolition work the contractor shall prepare and submit for approval by the Architect, a schedule showing the commencement, the order, and the completion dates of the various parts of this work.

2. Before starting any work relating to existing utilities (electrical, heat, gas, etc.) that will temporarily discontinue or disrupt services to any existing building, the Contractor shall be required to give notice to the Architect and obtain his approval in writing before proceeding with this phase of work.

Part 2 - Materials (not applicable)

Part 3 - Execution

3.01 General Requirements:

A. Permits, Licenses, Ordinances and Regulations:
All work shall comply with local and other governing ordinance, codes and regulations, but this requirement does not relieve the Contractor of responsibility of complying with these specifications. Complying with requirements of state, county or local laws, ordinances and regulations regarding demolition work is the responsibility of the Contractor, who shall pay any and all fees, and give any notices necessary in connection therewith.

3.02 Demolition of Work To Be Modified:

A. Alterations and demolition shall be as indicated on the Drawings and in accordance with applicable technical sections of the specifications. The Contractor shall do all necessary demolition or removal of existing work as required in connection with this project, including shoring, bracing, etc. and removal of unwanted material and debris from the site. Demolish existing items only as necessary to tie on new construction as detailed. This work shall be done in a most careful manner, as the Contractor will be held responsible for any damage which may be caused thereby to any part or parts of existing streets,

neighboring buildings, and grounds.

B. When alterations occur, or new and old work join, the immediate adjacent surfaces or so much thereof as required by the involved conditions, shall be cut, removed, patched, repaired or refinished and left in as good a condition as existed prior to the commencing of the work, and matching the remainder of the existing paving, etc.

C. Conduit and piping found underground on the site, or other areas involved in demolition or alteration shall be removed, re-rerouted or protected as required by the Drawings. Where these items are found; but not covered in the drawings, the Contractor shall notify the Architect for disposition instructions.

D. Maintain existing utility services to remain and protect from damage during demolition operations.

E. The Contractor shall furnish and install adequate guards, barricades and other temporary protection to prevent injury to persons.

F. The Contractor shall make every effort to control the amount of dust and the noise level generated by demolition operations.

3.03 Ownership and Disposition of Materials:

A. Classification of removed materials (re: Drawings for applicable items):

1. **Reinstalled:** Items are those items which, after removal, are to be used, reinserted, remounted or otherwise built back into the work under this contract.
2. **Salvaged:** Items are those items which, after removal, are to be retained by the Owner and delivered for storage on the Owner=s premises.
3. **Scrapped:** Items are all other removed materials or equipment. This includes all items which are not noted or specified for reinstallation or salvage.

B. Disposition by Classification:

1. **Reinstalled:** Items of material or equipment shown on the work shall be jointly inspected by the Contractor and the Architect prior to dismantling or removal. An agreement shall be reached briefly setting forth the apparent condition of the material, or equipment, and approved by the Architect. Simple operating test of operative equipment will be included with this joint inspection if feasible. Such items shall be reinstalled as specified in the applicable sections of the specifications covering new items of similar categories.
2. **Salvaged:** Materials and equipment noted on the Drawings or listed to be salvaged shall be carefully handled and protected and shall be delivered to storage areas, as designated by the Architect, on the Owner=s premises.
3. **Scrapped:** All removed materials and equipment not noted on the drawings specified to be reinstalled, shall be considered as scrap and shall be disposed of by the Contractor off the Owner=s premises and credit for the

value thereof, if any, shall have been reflected in the Contractor's bid price.

3.04 Clean-Up:

A. Disposition of all material, debris and rubbish shall be the responsibility of the Contractor. Leave site clean. Completely remove all materials, debris, and rubbish from site. Absolutely no burning of debris on the site will be allowed.

B. **The Contractor shall submit proposed refuse dumping sites to the Architect and shall receive written approval from the Architect concerning acceptable dumping sites prior to the disposition of any material, debris or rubbish generated by this project.**

End of Section

DIVISION 2 - SITE WORK

SECTION 02100 - SITE PREPARATION

Part 1 - General

1.01 Work Included:

A. All materials, labor, services, and incidentals necessary for the completion of this section of the work.

B. Erection and maintenance of a temporary construction fence, as noted on the Drawings, shall be provided by the Contractor.

1.02 Protection of Trees and Shrubs:

A. All existing trees and shrubs in or near the construction area that are not indicated to be removed shall be protected. Should damage occur, the Contractor shall replace the tree or shrub with a similar size and species.

B. Periodically water as required to limit dust and dirt during construction.

C. Protect any adjacent property and improvements from damage, and replace any portions damaged through this operation.

Part 2 - Products

2.01 Materials:

A. Temporary Fencing: **Refer to Section 02110.**

Part 3 - Execution

3.01 Clearing and Grubbing:

A. Limits of clearing shall be all areas within contract limit lines.

B. Remove all organic or undesirable materials from areas where concrete is to be placed.

C. Within building lines and exterior concrete slabs remove roots, debris, rubbish, etc., and cut roots of adjacent trees and shrubs to remain, not less than 12" from concrete work.

D. From building lines and exterior concrete walks and slabs out to the limits of earth cut and fill, remove all exposed stumps and roots, brush, rubbish, etc.

E. Remove completely all existing trees designated on Drawings.

F. Remove topsoil to depth of organic matter and stockpile on site for use in grading.

3.02 Removal of Improvements:

A. Remove all above-grade and below-grade improvements indicated on the Drawings or as necessary for the installation of new work.

3.03 Disposal of Debris:

A. Burning of combustible materials on the site will not be permitted. Completely remove from site and legally dispose of all materials and debris.

End of Section

DIVISION 2 - SITE WORK

SECTION 02110 - TEMPORARY CONSTRUCTION FENCING

Part 1 - General

1.01 Summary

A. Section includes: Erection, maintenance and dismantling of temporary fencing around construction site and materials storage areas. This section does not apply where security fencing is required.

B. Refer to Drawings for temporary fencing layout and location of gates.

1.02 Submittals

A. Submit the following:

1. Shop drawing indicating layout of temporary fencing, location and size of gates, existing pavement and roads, access to fire hydrants and hose connections, and other site specific conditions. Prepare drawing after site observation and verification of existing conditions.

Part 2 - Products

2.01 Temporary Chain Link fencing:

A. Unless otherwise indicated, type of temporary chain link fencing shall be Contractor's option. Following types are acceptable:

1. New materials or previously used salvaged chain link fencing in good condition.
2. Posts: Galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings, driving into ground, anchoring with base plates, or inserting in precast concrete blocks.
3. Fabric: Woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.
4. Height: Minimum Height shall be 8'-0".

B. Gates: Provide personnel and vehicle gates of the quantity and size indicated on the Drawings or required for functional access to site.

1. Fabricate of same material as used for fencing.
2. Vehicle gates:
   a. Minimum width: 20 feet to allow access for emergency vehicles.
   b. Capable of manual operation by one person.

Part 3 - Execution:

3.01 Layout:

A. Installation of temporary fencing shall not deter or hinder

access to existing and new hose connections and fire hydrants.
1. Maintain 3 feet diameter clear space around fire hydrants.
2. Where fire hydrant or hose connection is blocked by fencing, provide access gate.

B. Access: Provide gates for personnel, delivery of materials, and access by emergency vehicles.

3.02 Installation:

A. Chain link posts:
1. Space at 10'-0" maximum.
2. Drive posts, set in holes and backfill, or anchor in precast concrete blocks.
3. For soft and unstable ground conditions, cast concrete plug around post.
4. Posts over pavement: Use steel post plates or precast concrete blocks.
5. Gate posts: Use bracing or concrete footings to provide rigidity for accommodating size of gate.

B. Fabric: Securely attach to posts.

C. Gates: Install with required hardware.

D. Plastic mesh fencing: Space steel support posts to ensure mesh remains vertical and at proper height. Securely tie mesh to posts.

3.03 Maintenance and Removal:

A. Maintain fencing in good condition. If damaged, immediately repair.

B. Remove temporary fencing upon completion of Work or when no longer required for security or control. Backfill holes and compact. Holes in pavement shall be surfaced to match existing paving. Repair damage caused by installation of temporary fencing.

End of Section

SECTION 02110 - TEMPORARY CONSTRUCTION FENCING

DIVISION 2 - SITE WORK

SECTION 02200 - EARTHWORK

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Site Preparation - Section 02100
- B. Paving and Surfacing - Section 02500
- C. Cast-In-Place Concrete - Section 03300

1.03 Quality Assurance:
- A. Standards:
  1. American Society for Testing and Materials
     a. ASTM D-1556, Density of soil in place
- B. **Testing: All required tests, and their fees, shall be the responsibility of the Contractor. The Contractor shall engage and pay for the services of an independent testing laboratory approved by the Architect.**
  1. Qualified according to ASTM E-329 and ASTM D-3740 for testing.
- C. Comply with 29 CFR 1926, Subpart P - Excavations (OSHA Regulations).

1.04 Submittals:
- A. Product data for each type of manufactured products required.
- B. Qualification data for testing agency.
- C. Material Test Reports for each borrow soil material proposed for engineered fill and backfill as follows:
  1. Classification according to ASTM D-2487.
  2. Laboratory compaction curve according to ASTM D-698.

1.05 Project Conditions:
- A. Traffic: minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
  1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and Authority Having Jurisdiction. Provide alternate routes around obstructions as required by authorities.

Part 2 - Products

2.01 Materials:
- A. Backfill Material: Approved low volume change material. If additional material required, it shall be low plasticity cohesive material (plasticity index between 5 and 18 and a maximum liquid limit of 35 percent). The moisture content of the low volume change soil should be adjusted to its optimum value, or above, before compaction. The suitability of materials, including off-site soils, shall be approved by the Geotechnical Engineer hired by the Contractor. Frozen material shall not be acceptable for backfilling.
- B. Top Soil: Material shall be native, fertile, neutral top soil of loamy character, free from heavy clay, coarse sand, stones,

lumps, plants, roots, or other foreign matter.

C. Gravel: Course gravel - 100% passing a 2" screen, 90% retained on a 1/4" screen.

D. Aggregate Base Course: Aggregate base - meet ASTM D448 size 57, 100 percent passing the 1**2**" sieve, less than 5 percent passing the #8 sieve, plasticity index less than or equal to 6.

E. Hydrated Lime: meet requirements of ASTM C977.

Part 3 - Execution

3.01 Excavations:

A. General:

1. Excavations shall be made to the elevations and dimensions shown on Drawings.
2. If excavations are made deeper than called for on plans, no backfilling is permitted. Any additional depth or size shall be made up by additional concrete at no increase in contract price.
3. Foundations shall be plumb, bottoms level and of type indicated on Drawings with allowance for erection of any required forms or shoring, and inspection of footings, etc.
4. Shore and brace excavations where necessary to prevent cave-ins, and in accordance with all safety laws and codes, including all OSHA requirements.
5. If an excavation must remain empty through a shutdown period, cover hole with suitable protection materials and clean out immediately prior to placing concrete.
6. Keep excavations free of water by use of pumps.
7. Keep area around excavations and concrete work clean for a distance of 3 feet all directions until concrete is placed and has set.

B. Footings / Grade Beams:

1. Footing bottoms shall be level, clean, clear of loose and objectionable material, and true to size.
2. Concrete for footings shall be poured as soon as possible after excavation has been completed. Excavations shall be protected until concrete has been poured.

C. Exterior and Pavement Sections:

1. Excavate to underside of walks, curb, gutter, and miscellaneous items.
2. Excavation shall be away from sides of grade beams and retaining walls below grade to a sufficient distance for erecting and removing forms with assured safety for workmen.
3. Bottoms of excavated areas shall be level and kept clean of loose and objectionable materials at all times.

D. All excavations for concrete footings, foundations or slabs shall be kept dry at all times and shall be completely dry at

the time of any concrete pour. The Geotechnical Engineer, **hired by the Contractor**, shall make final approval of all excavations prior to the start of any concrete placement.

3.02 Classification of Excavation:

A. All excavation shall be unclassified and the term "unclassified excavation" shall be understood to mean all and any materials encountered during excavation - including old floors, pavement, foundations, rock, earth, piping and debris. No adjustment in the contract price will be made on account of the presence or absence of rock, hard or soft sandstone, shale, masonry, or other materials.

3.03 Unknown Utilities:

A. Unknown Utilities:

1. If any unknown and uncharted utilities are encountered during excavation, promptly notify the Architect and wait for his instructions before proceeding.
2. If it is ascertained by the Architect that such utility line has been abandoned, the Contractor shall properly cap the line at depth of 12" or more below finish grade.
3. If such unknown utilities are encountered and work is continued without contacting the Architect for instruction, and damage is caused to said utilities, the Contractor shall repair, at his own expense, such damage to the satisfaction of the utility company concerned.

B. Unknown Obstacles:

1. If any unknown obstacles such as house or small building foundations or such as residential size basements, cisterns, etc., are encountered, the Contractor at his own expense shall remove the foundations, fill basements or cisterns or perform any work necessary to complete the work of this contract.
2. Should the Contractor encounter any unforeseen major obstacle in excavation, such as an abandoned water-well, subsurface streams, or "cave-ins" etc., which prove to be unduly expensive to overcome, it is the intention to cause a survey to be made to determine a course of action that will relieve the Contractor of undue expense.

3.04 Fill and Backfill:

A. Preparation for Concrete slab item on Fill:

1. Site preparation shall include removing existing vegetation, and any other unsuitable materials encountered. Refer to Soils Report and Structural Drawings concerning additional preparation procedures. The prepared area shall extend beyond the building footprint a minimum of 5 feet laterally. After performing the required cuts, proofroll existing site with a loaded, tandem-axle dump truck weighing at least 25 tons. Proofrolling shall involve overlapping passes in mutually perpendicular directions. After proofrolling, unstable soil should be overexcavated and replaced with a low volume change soil. Scarify existing soil at base of fill to

a minimum depth of 8"; moisture content of scarified soil shall be adjusted to a minimum of 2% above the material=s optimum content, as determined by the standard Proctor method ASTM D-698, and be compacted to at least 95 percent of its maximum dry density.

2. Provide fill material to bring site to required grade. Refer to 2.01A.
3. Compaction: Compact fill in lifts not exceeding 8" in loose thickness. Compact soil according to table below. Tests shall be required and paid for by the Contractor. Any additional moisture required to achieve compaction in a layer should be added and the entire lift mixed to obtain the uniform moisture content.
4. Compaction shall not be attempted using water settling.
5. **Care shall be taken to maintain the minimum recommended moisture content in the subgrade until floor slabs are constructed. Positive drainage shall also be developed away from building to prevent water from ponding along the perimeter and affecting future floor slab performance.**

B. Preparation for Paving items on fill:

1. Before compaction, the top 8" of the stabilized soil zone shall be modified with a minimum of 7% hydrated lime. The lime shall be thoroughly blended into the subgrade and allowed to cure for 48 to 72 hours before being remixed and compacted. Before compaction, the treated soil zone shall be adjusted to within 2 percentage points of optimum moisture as determined by the standard Proctor method (ASTM D-698); then compacted to at least 98 percent of the material’s maximum standard Proctor dry density.

C. Backfill at Walls (including footing and foundation walls):

1. Fill material shall be approved backfill material except as noted on Drawings.
2. Backfill around footing and foundation walls must be compacted.

3.05 Exterior Fill and Grading:

A. Fill:

1. Subgrade fill as shown on plot plan, placed in 4" to 8" layers, to within 6" of finish. Compact according to table below.
2. Top 6" of graded surface shall be approved top soil.

B. Lines and Grades:

1. Work shall conform to lines and grades shown on the Drawings. Ruts holes and depressions shall be filled with approved material.
2. The slopes between contours or between spot elevations shall be smooth, uniform slopes and the surface shall be finished to a tolerance of 2" in 10' under a straight edge.

3.06 Compaction (fills less than 8'-0" thick):

Soil Compaction Criteria

Minimum Compaction (%) per ASTM D698

Use	Exposed in-situ subgrade soil	Fill	Base Course
Beneath foundation components	95	95	95
Beneath pavements, curbs and sidewalks (Stabilized on-site soil)	98	98	95
Aggregate base (at slab)			98
Aggregate base (at pavements)			
Beneath exterior slabs and utility trench backfill (stabilized on-site soil)	95	95	95
Miscellaneous backfill (non-load bearing)	90		

3.08 Testing:

A. Make at least one density test of subgrade for every 2500 square feet of paved area or building slab, but in no case less than 5 tests.

B. In each compacted fill layer, make one density test for every 2500 square feet of overlaying building slab or paved area, but in no case less than 8 tests.

3.09 Trenching and Backfilling of Utilities:

A. The Contractor shall do all excavation and backfilling necessary for the installation of all utilities, including shoring, bailing, and pumping required to maintain the excavations in a safe and dry condition.

B. All excavations shall be backfilled in 4" to 6" layers and thoroughly compacted one layer at a time with a mechanical tamper. Backfill material under areas where walks, drives, slab, parking areas, etc., are to be constructed shall be fill sand (free of all dirt). Backfill material in other areas shall be excavated material. Where excavation is not to be built over, replace the top 12" with existing top soil. Remove superfluous materials from job site.

End of Section

DIVISION 2 - SITE WORK

SECTION 02202 - EARTHWORK FOR UTILITIES

Part 1 - General

1.01 Applicable Publications: The publications of the organizations listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

A. American Society for Testing and Materials (ASTM) Publications:

1. Sieve or Screen Analysis of Fine and Coarse Aggregates.
2. Liquid Limit of Soils.
3. Plastic Limit and Plasticity Index of Soils.
4. Moisture Density Relations of Soils and Soils Aggregate Mixtures Using 5.5 lb. (2.49 KG.) Rammer and 12 in. (305.mm) Drop.
5. Amount of Material in Soils Finer than the No. 200 (75 micrometer) Sieve.
6. Density of Soil in Place by the Sand Cone Method.
7. Moisture Density Relations of Soils and Soil Aggregate Mixtures Using 10 lb. (4.54KG) Rammer and 18 in. (457 mm) Drop.
8. Breaking Load and Elongation of Textile Fabrics.
9. Underground Installation of Flexible Thermoplastic Sewer Pipe.
10. Classification of Soils for Engineering Purposes.
11. Underground Installation of Thermoplastic Pressure Piping.
12. Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth).

B. American Water Works Association (AWWA) Publications:

1. The Selection of Asbestos Cement Distribution Pipe, 4 in. Through 16 in., for Water and Other Liquids.
2. Installation of Gray and Ductile Cast Iron Water Mains and Appurtenances.
3. Installation of Asbestos Cement Pressure Pipe.
4. Steel Pipe Design and Installation, 1964 Edition.

1.02 Description: This section covers all earthwork requirements for piping systems specified in Section 02550 - Sanitary Sewer Gravity and Section 02551 - Water Lines. This section covers requirements for excavation and for compaction of succeeding layers after backfill has been placed around pipe as specified in the respective sections for these systems.

1.03 Quality Assurance:

A. Standards:

1. American Society for Testing and Materials
   a. ASTM D-1556, Density of soil in place

B. Comply with 29 CFR 1926, Subpart P - Excavations (OSHA Regulations).

C. **Testing: All required tests, and their fees, shall be the responsibility of the Contractor. The Contractor shall engage and pay for the services of an independent testing laboratory approved by the Architect.**

1.04 Submittals:

A. Certified Test Reports: Submit certified test reports for the following:
   1. Sand tested in accordance with ASTM C136 and ASTM D2487.
   2. Porous fill tested in accordance with ASTM C136.

B. Shoring and Sheeting Plan: Before starting work submit a shoring and sheeting plan as required to meet O.S.H.A. regulations.

C. Manufacturer's Data: Submit manufacturer's descriptive literature, detailed specifications, available performance test data, instructions, and recommendations for buried warning and identification tape.

1.05 Delivery and Storage: Deliver and store materials in a manner to prevent deterioration, contamination or segregation.

1.06 Criteria For Bidding: Base bids on the criteria listed below. Hard material is defined as solid rock, firmly cemented un-stratified masses, or conglomerate deposits possessing the characteristics of solid rock which can not ordinarily be removed without systematic drilling and blasting, and any boulder, masonry, or concrete except pavement, exceeding 2 cubic yard in volume.

A. That the surface elevations are as indicated.

B. That no pipes or other artificial obstruction, except those indicated will be encountered.

C. That the character of the material to be removed is as indicated.

1.07 Protection:

A. Shoring and Sheeting: Provide shoring and bracing where required for compliance with O.S.H.A. regulations.

B. In addition to any other requirements set forth in this Contract, meet the following requirements:
   1. Prevent undermining of pavements and slabs.
   2. Banks may be sloped where space permits and as directed.
   3. Where shoring and sheeting materials must be left in place in the completed work to prevent settlements or damage to adjacent structures or as directed, backfill the excavation to 3 feet below the finished grade and remove the remaining exposed portion of the shoring before completing the backfill.

C. Shoring and Sheeting Plan: Shall include detailed drawings

and the following:

1. Design calculations by a Registered Professional Engineer.
2. The sequence and methods of installation and removal.
3. The materials, sizes, and arrangement of members proposed for use as shoring and bracing.

1.08 **Minimum Burial Depths:**

A. Water Lines: refer to Plumbing Drawings.

B. Sewer Lines: refer to Plumbing Drawings.

Part 2 - Products

2.01 Soil Materials: In general, shall be free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, frozen, deleterious, or objectionable materials.

A. Backfill: Shall conform to the general requirements for soil materials above and shall be material excavated on the site of this project. This material is unclassified and no testing will be required before use as backfill.

B. Sand: Shall conform to the general requirements for soil materials above and shall be clean, coarse grained material classified as SW by ASTM D2487 of which no more than 10 percent by weight shall be finer than the No. 200 sieve.

C. Gravel: Shall conform to the general requirements for soil materials above and shall be clean, coarse grained material classified as GP by ASTM D2487 of which no more than 10 percent by weight shall be finer than the No. 200 sieve.

D. Crushed Stone: Shall conform to the general requirements for gravel above and a minimum of 10 percent of the particles shall have at least one fractured face and the maximum particle size shall be 3/4 inches.

E. Porous Fill: Shall conform to the general requirements for gravel above and shall pass a 2 inch sieve and be retained on a 1/2 inch sieve.

F. Bedding:

a. Shall Be SW sand for water lines.

b. Bedding shall be ASTM type 57 crushed stone for sanitary sewer lines.

G. Materials For Use in Pipe Installations: Bedding and backfill materials shall conform to requirements specified herein, except as modified herein by the respective specifications and requirements listed following:

PIPE MATERIALS	MATERIAL REFERENCE
1. Ductile Iron Soil Pipe	AWWA C600, except refill

		of overcut shall be crushed stone. Bedding shall be GW.
	2. Metallic Water Service Line Pipe (Steel, Copper Tube).	AWWA C600
	3. Polyethylene (PE) Pressure pipe	ASTM D2774, except bedding shall be SW and all material surrounding the pipe shall have maximum particle size of 1/2 inch.
	4. Polyvinyl Chloride (PVC)	ASTM D2321, except bedding shall be SW and all material surrounding the pipe shall have maximum particle size of 1/2 inch.
	5. Polyvinyl Chloride (PVC) Pressure Pipe	ASTM D2774, except bedding shall be SW and all material surrounding pipe shall have maximum particle size of 1/2 inch..

H. Topsoil: Shall be material free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material or substance detrimental to plant growth. Topsoil shall be a natural, friable soil representative of productive soils in the vicinity.

I. Borrow: Shall be materials conforming to the requirements for backfill.

J. Embankment: Embankment material shall be in accordance with Borrow material and shall be approved by the Architect.

2.02 Buried Warning And Identification Tape: Shall be polyethylene plastic tape manufactured specifically for warning and identification of buried utility lines. Tape shall be provided in rolls, 6 inches minimum width, color coded for intended service with warning and identification imprinted in bold black letters continuously and repeatedly over entire tape length. Warning and identification shall be "CAUTION BURIED (Intended Service) LINE BELOW" or similar wording. Code and letter

coloring shall be permanent, unaffected by moisture and other substances contained in trench backfill material.

Part 3 - Execution

3.01 Surface Preparation:

A. Stockpiling Topsoil: Strip suitable soil from the site where excavation or grading is indicated and stockpile separate from other excavated material. Material unsuitable for use as topsoil shall be stockpiled and used for backfilling. Locate topsoil such that the material can be used readily for the finished grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and maintain in segregated piles until needed.

B. Cutting Pavement, Curbs, and Gutters: Make cuts with neat, parallel, straight lines one foot wider than trench width on each side of trenches and one foot beyond each edge of pits.

3.02 General Excavation: Shall be to the elevations and dimensions indicated or otherwise specified. Keep excavations free from water while construction is in progress. Notify the Architect immediately in writing if it becomes necessary to remove hard, soft, weak, or wet material to a depth greater than indicated. Make trench sides as nearly vertical as practicable except where sloping of sides is allowed. Sides of trenches shall not be sloped from the bottom of the trench up to the elevation of top of the pipe. Excavate ledge rock, boulders, or hard material to an overdepth at least 4 inches below the bottom of the pipe unless otherwise indicated or specified. Blasting will not be permitted. Stabilize soft, weak, or wet excavations as indicated. Use bedding material to refill overdepth to the proper grade and place in 6 inch maximum layers. At the option of the Contractor, the excavations may be cut to an overdepth of not less than 4 inches and refilled to required grade as specified. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe on undisturbed soil, or bedding material as indicated or specified at every point along its entire length except for portions where it is necessary to excavate for bell holes and for making proper joints. Dig bell holes and depressions for joints after trench has been graded and dimension to ensure that the bell does not bear on the bottom of the excavation.

3.03 General Bedding: For utility lines and utility line structures shall be one of the materials and depths indicated. Place

bedding in 6 inch maximum loose lifts. Provide uniform and continuous support for each section of structure except at bell holes or depressions necessary for making proper joints.

A. Refill: Is defined as material placed in excavation to correct overcut in depth.

B. Concrete Cradles: Specified in lieu of other types of bedding for a particular type of pipe material, shall be as indicated.

3.04 General Backfilling: Surround pipes with backfill as indicated. Ensure that backfill is placed completely under pipe haunches. Place in 6 inch maximum loose lifts to one foot above pipe unless otherwise specified. Bring up evenly on each side, and for the full length, of the structure. Ensure that no damage is done to structures or protective coatings thereon. Place the remainder of the backfill in 12 inch maximum loose lifts unless otherwise specified. Compact each loose lift as specified in Paragraph "General Compaction" before placing the next lift. Do not backfill in freezing weather, where the material in the trench is already frozen or is muddy, except as authorized. Provide a minimum cover from final grade of 4 feet for water mains. Where unacceptable settlements occur in trenches and pit due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation. Coordinate backfilling with testing of utilities. Provide buried warning and identification tape.

3.05 General Compaction: Use hand operated plate type vibratory or other suitable hand tampers in areas not accessible to larger rollers or compactors. Be careful to avoid damaging pipes and protective pipe coatings. Compaction shall be in accordance with the following unless otherwise specified.

A. Compaction shall conform to Soil Compaction Criteria listed in Section 02200 - Earthwork for Buildings.

3.06 All trenches created for utility access under the building shall be effectively sealed to restrict water intrusion and flow along the trenches. Use a clay soil to construct an effective trench plug that extends at least 5 feet out from the face of the building. The clay should have a minimum plasticity index of 15 and be placed in controlled lifts not exceeding 9 inches in loose thickness so as to surround the utility line and fill the trench. Each lift of clay backfill should be compacted to at least 95 percent of the material=s maximum dry density as determined by the standard Proctor test method (ASTM D-698). The moisture content of the clay backfill should be adjusted to its optimum value or above before compaction.

3.07 Finish Operations:

A. Grading: Shall be to finished grades indicated within one tenth of a foot. Provide sod or topsoil in areas to be seeded as indicated. Grade areas to drain water away from structures. Existing grades which are to remain but are disturbed by the Contractor's operations shall be graded as directed.

B. Spreading Topsoil: Areas indicated to receive topsoil for the finished surface shall be free of materials that would interfere with planting and maintenance operations. Spread topsoil uniformly grade and compact to the thicknesses, elevations, and slopes indicated. Do not place topsoil when the subgrade is frozen, extremely wet or dry, or in other conditions detrimental to seeding, planting, or grading.

C. Borrow Areas: Shall be graded to drain properly.

D. Disposition of Surplus Material: Surplus or other soil material not required or suitable for filling, backfilling or grading shall be disposed of as directed by the Architect.

E. Protection of Surfaces: Protect newly graded areas from traffic, erosion, and settlements that may occur. Repair or re-establish damaged grades, elevations, or slopes.

F. Pavement Repair: Repair pavement, curbs, and gutters as indicated. Do not repair pavement until trench or pit has been backfilled and compacted as herein specified. Provide a temporary road surface of crushed stone over the backfilled portion until permanent pavement is repaired. Remove and dispose of temporary road surface material when permanent pavement is placed. As a minimum one way traffic shall be maintained at all times on roads and streets crossed by trenches; roads and streets shall be fully opened to traffic as quickly as possible.

3.08 Field Sampling and Testing: Test sand, gravel, bedding, and backfill for conformance to gradation limits in accordance with ASTM C136. Test sand, gravel, backfill and material used as subgrade under roads and other paved areas for material finer than the No. 20 sieve in accordance with ASTM D1140. Test backfill material used as subgrade under roads and other paved areas for liquid limit in accordance with ASTM D423 and for plasticity index in accordance with ASTM D424. Test bedding and backfill materials for moisture density relations in accordance with ASTM D698 & D1557. Perform at least one of each of the required tests for each material used. Provide additional tests as specified above for each source change. Perform density tests in randomly selected locations and in accordance with ASTM

D1556 or ASTM D2922 and ASTM D3017 as follows: one test per 100 lineal feet in each lift.

End of Section

DIVISION 2 - SITE WORK

SECTION 02500 - PAVING AND SURFACING

Part 1 - General

1.01 Work Included:
A. All materials, labor, services, and incidentals necessary to complete all Paving Work as shown on the Drawings and specified herein.

1.02 Related Work Specified Elsewhere:
A. Site Preparation - Section 02100
B. Earthwork for Buildings - Section 02200
C. Hot Mix Asphalt Paving – Section 02741
C. Cast-In-Place Concrete - Section 03300

1.03 Quality Assurance:
A. Standards:
1. American Society for Testing and Materials (ASTM).
2. American Association of State Highway and Transportation Officials (AASHTO).
3. Oklahoma Department of Transportation (ODOT) Standard Specifications for Highway Construction.

B. **Testing: All required tests, and their fees, shall be the responsibility of the Contractor. The Contractor shall engage and pay for the services of an independent testing laboratory approved by the Architect.**

1.04 Paving Quality Requirements:
A. General: In addition to other specified conditions, comply with the following minimum requirements:
1. Test concrete as required under Section 03300 - Cast-In-Place Concrete.
2. Test subgrade preparation as required under Section 02200 - Earthwork for Buildings.

B. Provide final surfaces of uniform texture, conforming to required grades and cross-sections. Finished surface tolerance - 1/2" in 10'-0" under a straightedge.
C. Thickness: In-place compacted thickness shall not be acceptable if not meeting the minimum thickness indicated on the Drawings.

1.05 Coordination:
A. Coordinate work and cooperate with any other trades whose work relates to paving in any way.

1.06 Personnel:
A. All work shall be directed by trained and experienced applicators, thoroughly adept at the procedures and equipment required by this section.

1.07 Weather Limitations:
A. Do not install paving when the subgrade is frozen or show any evidence of excessive moisture.
B. Do not install paving when the air temperature is less than

40 degrees Farenheit nor when temperature of the surface on which mixture is to be placed is below 40 degrees Farenheit unless directed otherwise by Architect.

Part 2 - Products

2.01 Material Applications:

A. Subgrade Preparation:

1. Description: Refer to Section 02200 - Earthwork, Part 3, 3.01 and 3.04.

B. Concrete Paving:

1. Description: A minimum 4,000 p.s.i. 28 day concrete slab with a minimum cement content of six (6) sacks per cubic yard on prepared base and subgrade course. Provide steel dowels at all expansion and construction joints. The concrete shall be reinforced with #3 bars at 24" o.c. Provide expansion and saw joints as shown on the Drawings.

C. Concrete Curbs:

1. Description: Concrete curbs and/or gutters constructed of a minimum 4,000 p.s.i., 28 day concrete with a minimum cement content of six (6) sacks per cubic yard on prepared base and subgrade course. Provide steel dowels at all expansion and construction joints.

D. Concrete Walks:

1. Description: A 4,000 p.s.i. reinforced concrete slab on a sand base. Provide expansion and saw cuts as shown on the Drawings.

E. Paint:

1. Parking lot paint shall be Pittsburg Paints Speedhide High Performance Test Drying Safety Paint:
   a. Colors:
      1. Parking stall striping, directional arrows, and miscellaneous markings - white.
      2. All handicapped markings shall be blue field with white symbol and border.
      3. Fire lane striping and curbs - red with white letters indicating “FIRE LANE - NO PARKING”.
      4. Light Pole Base (where applicable) - yellow.
      5. Lane Striping Separation of Traffic in Opposite Directions - double line yellow.

F. Asphalt Paving: refer to Section 02741 – Hot Mix Asphalt Paving.

2.02 Expansion Control:

A. Construction Joint Form: Tongue and groove keyway, premolded asphaltic or wood form, designed to provide 1 1/2" keyway.

B. Joint Filler: Resilient, non-extruding

bituminous-impregnated fiberboard expansion joint material by thickness shown on the Drawings, ASTM D-1751.

C. Joint Sealers: Hot applied, non-tracking asphalt-rubber compound, ASTM D-1190.

D. Anchorage Inserts: Malleable cast iron adjustable wedge, or threaded, type with 3/4" bolt size unless indicated otherwise on the Drawings.

E. Embedded Items: Provide materials as sized and/or indicated on the Drawings, or as required.

Part 3 - Execution

3.01 General:

A. Make careful inspection of excavated surface on which paving is to be placed, and check on bottom and top grades of paving throughout the area to be paved, prior to starting work under this section. Notify the Contractor of any unsatisfactory conditions. Do not begin paving work until such conditions have been corrected and area is ready to receive paving.

3.02 Workmanship:

A. Apply paving in true planes to eliminate depressions or "fat" spots. Carefully warp changes in slope. Carefully hand compact and roll around building projections so that texture and compaction matches machine compaction. Mask building before placing concrete primer to prevent staining exposed building surfaces, and concrete curbs.

B. All concrete curb and gutter shall be constructed to the alignment and grades shown on the plans.

C. Backfill shall be placed behind the sidewalks in a manner that will not cause displacement of the section nor damage to the exposed edges. All damaged sidewalks shall be replaced at the direction of the Architect at the Contractor=s expense.

D. Adjoining Paving: where new work adjoins existing, warp carefully to flush surface, with seal over joint.

E. Construction Joints: As noted on the Drawings or as directed by the Architect:

1. At joints, thoroughly clean surfaces and remove all laitance.
2. In addition, vertical surfaces shall be thoroughly wetted and coated with cement grout before placing new concrete.

F. Expansion Joints: As noted on the Drawings, or as directed by the Architect:

1. Provide 1/2" expansion joints where sidewalks join structural concrete.
2. Hold filler material down 1/2", fill top with sealant.

G. Control Joints: Provide scored lines and weak plane joints

on exterior and interior concrete slabs as indicated on the Drawings, and as approved by the Architect. Fill with sealant.

H. Finishes:
   1. Concrete Walks and Pavement:
      a. Provide trowel and medium broom finish. Refer to drawings.
      b. Broom after concrete is hard enough to retain scoring, using a stiff fiber, or wire, broom. Broom perpendicular to direction of traffic.

I. Repair any damage to finished pavement surfaces that may result from subsequent construction to a smooth, true, and uniform surface.

J. Clean-up: After completion of paving operations, remove all excess materials, equipment and debris (dispose of away from the site). Leave all work in clean condition.

K. Protection:
   1. Provide barricades and warning devices as required to protect pavement and the general public.
   2. Cover any openings of structures in area of paving until permanent coverings are installed.
   3. Prohibit all traffic on paving until it has reached atmospheric temperature.

L. Pavement Markings:
   1. Surface shall be dry, free of oil, and grease, and cleaned of all loose dirt.
   2. Paint shall be spray applied to a wet film thickness of 12-15 mils.
   3. The paint shall be spray applied in accordance with manufacturer’s recommendations.
   4. Do not apply paint markings on surfaces that are not dry or if rain is expected within 24 hours.
   5. Do not apply paint markings when surface temperature is below 50 degrees F.
   6. At sidewalks, and where applicable, use straightedge to provide uniform, clean, and straight stripe.

End of Section

DIVISION 2 - SITE WORK

SECTION 02550 - SANITARY SEWER GRAVITY

Part 1 - General

1.01 Work Included:
- A. All materials, equipment, labor, services and incidentals necessary for the completion of this section of work.
- B. Work specified herein will include installation of sewer service lines, sewer mains, joints, clean outs, and associated testing.
- C. Backfilling shall be accomplished after inspection by the Architect.
- D. Work covered by this section will not be accepted until backfilling connected with the work has been completed satisfactorily.

1.02 Related Work Specified Elsewhere:
- A. Excavation, trenching, and backfilling shall be in accordance with the applicable provisions of Section 02202 - Earthwork for Utilities (except as modified herein).

1.03 Submittals: Contractor shall submit 30 days after date of receipt of notice to proceed, a complete list of materials and equipment showing the types, sizes, catalog number, manufacturer=s name for each of the following items to ensure compliance with the specifications.

1.04 Wye and Service Line Record: The Contractor shall keep a wye record showing the distance in feet from the manhole to each wye or connection placed in the sewer main. A service line record shall be kept showing the length of pipe installed and the location in relationship to the house and wye connection point. The record shall also locate all clean outs and bends. No payment for sewer work will be made until the wye and service line record is furnished to the Architect.

1.05 **Minimum Burial Depth: refer to Plumbing Drawings.**

Part 2 - Products

2.01 Pipes:
- A. PSM Polyvinyl Chloride (PVC) Pipe and Fitting: ASTM D3034; SDR 35.
  1. Elastomeric Gaskets for Compression Joints ASTM F477.
- B. Ductile Iron Pipe (Class 52) and Cast Iron Fittings: ASTM A536 with physical properties of Grade 60-42-10.
  1. Rubber Gaskets for Compression Joints AWWA Designation C111 (ANSI A21.11).

2.02 Cleanouts: Cleanouts shall be iron ferrule with metal counter sunk screw plugs set in formed square concrete collar. Re: Mechanical.

SECTION 02550 - SANITARY SEWER GRAVITY

Part 3 - Execution

3.01 Pipe Laying:

A. Pipe shall be protected during handling against impact shocks and free fall and the pipe interior shall be free of extraneous material.

B. Pipe laying shall proceed upgrade with bell ends upgrade. Each pipe shall be laid accurately to the line and grade shown on the Drawings. Pipe shall be laid and centered so that the sewer has a uniform invert. The alignment of the installed pope shall appear straight to the naked eye and shall be such that a full circle of light can be seen between manholes, etc., when sighting along all points of the pipe circumference.

C. Before making pipe joints all surfaces of the portions of the pipe to be joined shall be clean and dry. Lubricants, primers, and adhesives shall be used as recommended by the pipe manufacturer. The joints shall then be placed, fitted joined, and adjusted to obtain the degree of water tightness required.

D. Water and Sewer Line Separation: Where the location of the sewer line is not clearly defined in dimensions on the Drawings, the sewer line shall not be laid closer horizontally than 10 feet from a water line except where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, in which case the sewer line shall not be laid closer horizontally that 6 feet from the water pipe. Where water lines cross under gravity flow sewer lines, the sewer pipe for a distance of at least 10 feet each side of the crossing shall be fully encased in concrete or shall be made of pressure pipe with no joint located within 3 feet horizontally of the crossing. Joints in the sewer main, closer horizontally than 3 feet to the crossing, shall be encased in concrete. Where a water main crosses over an existing sanitary sewer main, the sewer line shall be uncovered to its spring line and a concrete cradle constructed for a distance of 10 feet each side of the water main. The water line shall not pass through or come into contact with any part of a sewer manhole.

E. Trenches shall be kept free of water and as dry as possible during bedding, laying, and jointing and for a long a period as required. When work is not in progress, open ends of pipe and fittings shall be satisfactorily closed so that no trench water or other material will enter the pipe or fittings.

F. Bedding: Sanitary sewer shall be bedded in crushed stone (ASTM Type 57) from 4 inches below pipe to 4 inches above the pipe. Bedding shall be placed as soon as possible after the joint is made to prevent pipe

movement off line or grade.

G. Width of Trench: If the maximum width of the trench at the top of the pipe, as specified in Section 02202: Earthwork for Utilities is exceeded for any reason other than by direction, the Contractor shall install at no additional cost to the Government such concrete cradling, pipe encasement, or other bedding as may be required to satisfactorily support the added load of the backfill.

I. Joints between different pipe materials shall be made as herein before specified, using approved jointing materials.

J. Handling and Storage: Pipe, fittings and joints material shall be handled and stored in accordance with the manufacturer=s recommendations.

K. All pipe shall be bedded per Section 02202: Earthwork for Utilities, unless otherwise indicated on the plans or ordered by the Architect.

L. Where a project out falls into an existing sanitary sewer, construction of the physical connection to the existing line shall be delayed until all upstream underground construction, including exfiltration testing, is complete and accepted unless special permission is granted by the Architect. Care shall be exercised during construction, flushing and testing operations of this connecting link to assure that water is not diverted into any portion of a sanitary sewer line in service or a sanitary sewer line which is not a portion of the construction project for which the Contractor is responsible.

M. No pipe shall be laid when the bottom of the ditch or the sides to one foot above the pipe is frozen. No backfill containing frozen material shall be placed within 3 feet of the pipe, nor shall the trench be left open during freezing weather so that temperatures of the material near the pipe goes below freezing.

3.02 Wye Branches: Wye branches shall be installed where sewer connections are indicated or where directed. Cutting into piping, for connections shall not be done except in special approved cases. When conditions are such that the connecting pipe shall be encased in concrete backfill or supported on a concrete cradle as directed. Concrete required because of conditions resulting from faulty construction methods or negligence by the Contractor shall be installed at no cost to the Owner.

3.03 Testing:

A. Alignment and Grade: As the pipe laying progresses, and after partial backfilling, the interior of the sewer shall be visually inspected for alignment and grade, by means of artificial or reflected light. Necessary corrections shall be made by the Contractor at no additional cost to the Owner.

B. Sewer and Manholes: Sewer and manholes shall be subject to test for leakage after the lines have been partially backfilled, in accordance with the following:

1. General:
   a. The Contractor shall clean all sanitary sewer installed, and in addition to this all sanitary sewer pipe shall be flushed. All sand, debris, mortar and other foreign materials shall be removed from sanitary sewer pipe and manholes prior to testing or final inspection.
   b. All sanitary sewer pipe installed will be subject to either an infiltration teat or an exfiltration test. In those areas where, in the opinion of the Architect, the water table is high enough to subject the pipe to a satisfactory infiltration test, it is not anticipated that an exfiltration test will be required. In checking leakage there will be no allowance made for external hydrostatic head.
   c. Where in the opinion of the Architect, the water table is not high enough to provide a satisfactory infiltration test, an exfiltration test will be required.
   d. The type of test (either infiltration or exfiltration) shall be determined by the Architect.
   e. All wyes, tees, or ends of side sewer stubs shall be plugged or capped and the plug or cap shall be securely fastened to withstand the internal test pressures. Such plugs and caps shall be readily removable and their removal shall provide a socket suitable for extending the lateral connection.
2. Exfiltration Test (Using Water):
   a. On completion of a section of sanitary sewer between manholes or otherwise, the Architect will require that the ends of all pipe be plugged, including service connections, and the pipe subjected to a hydrostatic pressure. Generally, all testing is to be conducted after backfilling prior to resurfacing and after service connections are made. The lengths of service connections shall be included in the computations to determine the allowable leakage for the test section.
   b. A minimum head of 6 feet of water above the crown at the upper end of the test section shall be maintained for a period of 4 hours during which time it will be presumed that full absorption of the pipe

body has taken place and thereafter for a further period of 1 hour for the actual test leakage. During this 1 hour period the measured loss shall not exceed the rate given in the following formula:

E=0.004DL

E=Allowable leakage in gallons per hour.
D=Nominal inside diameter of pipe in inches.
L=Length of pipe being tested in feet.

3. Infiltration Test:
   a. Infiltration testing may be allowed at the Architect=s option when the natural ground water table is 6 feet or more above the crown of the higher end of the test section. The maximum allowable limit for infiltration shall be as determined bu the Formula E=0.004DL.
   b. The Contractor shall furnish all tools, equipment and labor necessary to complete the tests and shall know from his own observations, or preliminary tests, that each line conforms with this Specification before requesting the Architect to observe and record the actual leakage. The Contracting Officer may require the Contractor to repair obvious leaks even though the total length of the test section falls within the maximum allowable leakage for the test used.
4. Deflection Test: All sanitary sewer must pass deflection test by use of pulled mandrel. Contractor to supply the mandrel to be inspected and approved by engineer. Deflection shall not exceed 5% of pipe diameter. Deflection test to be performed not less than 30 days after final backfilling.
5. Air Testing: Air tests shall be conducted on each manhole-to-manhole section of sewer. The air test shall be performed in accordance with the following specifications:
   a. **Equipment -** Cherne Air-Loc Equipment as manufactured by Cherne Industrial of Hopkins, Minnesota or approved equal. Equipment used shall meet the following requirements:

      1) Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.

2) Pneumatic plugs shall resist internal test pressure without requiring external bracing or blocking.
3) All air used shall pass through a single control panel.
4) Three (3) individual hoses shall be used for the following connections: (a) from the control panel to pneumatic plugs for inflation; (b) from the control panel to sealed line for introducing the low pressure air; and (c) from sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

b. **Procedures -** All pneumatic plugs shall be seal-tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to twenty-five (25 psig) pounds per square inch gauge. The sealed pipe shall be pressurized to five (5 psig) pounds per square inch gauge. If a ground water level over the top of the pipe is present, the pressure in psig shall be increased by the height of ground water level above top of pipe at upstream manhole divided by two and one third (2.3). The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

After a manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedures, the plugs shall be placed in the line at each manhole and inflated to twenty-five (25 psig) pounds per square inch gauge. Low pressure air shall be introduced into this sealed line until the internal air pressure reaches four (4 psig) pounds per square inch gauge. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period (three and one half (3.5 psig) pounds per square inch gauge minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of the line being tested shall be termed "acceptable" if the time required in minutes for the pressure to decrease from three and one half (3.5) to two and one half (2.5 psig)

pounds per square inch gauge is not less than that shown in the following table:

Pipe Nominal Size (Inches)	Minimum Test Time (min:sec)	Length for Minimum Time (Feet)
6	2:50	751
8	3:47	564
10	4:43	450
12	5:40	376
15	7:05	302
18	8:30	250
21	9:55	215
24	11:20	188
27	12:45	167
30	14:10	150
33	15:35	138
36	17:00	125
42	19:50	107
48	22:40	94
54	25:30	83
60	28:20	75
66	31:10	68
72	34:00	63
78	36:50	58
84	39:40	54
90	42:35	51
96	45:20	47

For lengths in excess of "Length for Minimum Time" given in table above, additional testing time to be added to the "Minimum Test Time" is determined from the following equation:

$$t = 0.011\ (d^2)\ (L)$$

where t = additional testing time, seconds
d = nominal pipe diameter, inches
L = additional length, feet.

If the air leakage in any reach exceeds the allowable, it shall be

re-tested after the leaks are repaired.

4. The Contractor shall furnish and report on the test results prior to acceptable of the system including the following:
   a. Date of test.
   b. Name of person in responsible charge for the tests.
   c. Segments of pipe tested.
   d. Outline of test procedures used.
   e. Elapsed time for container to empty.
   f. Calculated minimum test duration times and calculated loss rate (exfiltration method).

End of Section

DIVISION 2 - SITE WORK

SECTION 02551 - WATER LINES

Part 1 - General

1.01 Work Included: This section covers water distribution lines, water service lines, and connections to buildings services at a point approximately 5 feet outside all buildings and structures to which service is required, complete as indicated on civil Drawings. Pipe and accessories shall be new and unused unless otherwise approved.

1.02 Piping for Water Service Lines Less Than 3 Inches in Diameter:

A. Piping for water service lines less than 3 inches in diameter shall be poly vinyl chloride (PVC) plastic, polyethylene (PE) or copper tubing, unless otherwise shown or specified. Piping for water service lines for sizes 3 inches and larger shall be ductile iron, or poly vinyl chloride (PVC) plastic through 12-inch nominal diameter, unless otherwise shown or specified.

1.03 Piping for Water Distribution Lines 3 Inches or Larger: Piping for water distribution lines 3 inches or larger shall be ductile iron, or poly vinyl chloride (PVC) plastic through 12-inch nominal diameter, unless otherwise shown or specified.

1.04 Recommendations of the Manufacturer: The Contractor shall, as a part of the shop Drawings, submit to the Architect the manufacturer's recommendations for each material or procedure to be utilized which is required to be in accordance with such recommendations. The Contractor shall have a copy of the manufacturer's instructions available at the construction site at all times.

1.05 Related Work Specified Elsewhere:

A. Excavation, trenching, and backfilling shall be in accordance with the applicable provisions of Section 02202 -Earthwork For Utilities.

1.06 **All water distribution and service lines shall have a burial depth adequate for protection from freezing. The burial depth shall be as indicated on the drawings, and the actual depth shall be approved by the Architect prior to any installation of water lines.**

Part 2 - Products

2.01 Pipe:

A. Copper Tubing: ASTM B88, Type K, annealed.

B. Ductile-Iron Pipe: ANSI A21.51, working pressure not less than 150 pounds per square inch unless otherwise shown or specified. Pipe shall be cement-mortar lined.

1. Cement-Mortar Lining: ANSI A21.4. Linings shall be standard thickness.

C. Poly Vinyl Chloride (PVC) Plastic Pipe: All pipe, couplings and fittings shall be manufactured of material conforming to ASTM D1784, Class 150 1245A or 1245B, designated as PVC 1120.

1. Pipe Less Than 4-Inch Diameter:
   a. Screw-Joint: Pipe, couplings, and fittings to dimensional requirements of ASTM D1785, with joints meeting requirements of 150 psi working pressure, 200 hydrostatic test pressure, unless otherwise shown or specified. Pipe couplings and fittings must be hydrostatically tested as required by AWWA C900. Screw joints for Schedule 80 pipe only.
   b. Elastomeric-Gasket Joint: Pipe couplings, and fittings shall be dimensional requirements of ASTM D1785, Schedule 40, with joints meeting the requirements of 150 psi working pressure, 200 hydrostatic test pressure, unless otherwise shown or specified, or it may be pipe, couplings and fittings conforming to requirements of ASTM D2241, elastomeric joint, with the following applications:

SDR	Maximum Working Pressure	Minimum Hydrostatic Pressure
21	120	160
17	150	200
13.5	200	266

   In addition to the above requirements the pipe, couplings and fittings must be hydrostatically tested as required by AWWA C900, and must be iron pipe size dimensions.
2. Pipe 4-Inch Through 12-Inch Diameter: Pipe, couplings and fittings 4-inch through 12-inch diameter shall conform to the requirements of AWWA C900, Class 150, C.I. pipe dimensions only, elastomeric gasket joint only, unless otherwise shown or specified.

D. Polyethylene (PE) Pressure Pipe: PE pipe tubing and fittings shall conform to AWWA C901, Type III, Grade 34 Class C material, Dr=7.0 for 160 psi design pressure.

2.02 Joints:

A. Copper Tubing: Joints shall be compression-pattern flared and shall be made with fittings hereinafter specified.

B. Ductile-Iron Pipe:
   1. Mechanical Joints shall be of the stuffing box type and shall conform to ANSI A21.11 as modified by ANSI A21.51.
   2. Push-on joints shall conform to ANSI A21.51.
   3. Rubber gaskets and lubricant shall conform to applicable requirements of ANSI A21.11.

C. Poly Vinyl Chloride Pipe and Polyethylene Pipe: Joints for

pipe, fittings, and couplings for pipe less than 4-inches in diameter shall be as given in Paragraph 3.07.D.1, and pipe 4-inch through 12-inch diameter shall be as given in Paragraph 3.07.D.2. Joints connecting pipe of differing materials shall be made in accordance with the manufacturer's recommendation as approved by the Architect.

2.03 Fittings and Specials:

A. For Copper Tubing: Fittings and specials shall be flared and shall conform to ANSI B16.26.

B. For Ductile-Iron Pipe: Fittings and specials shall be suitable for 150 pounds per square inch pressure rating, unless otherwise specified. Fittings and specials for mechanical joint pipe shall conform to ANSI A21.10. Fittings and specials for use with push on joint pipe shall conform to ANSI A21.10 and ANSI A21.11. Fittings and specials shall be cement-mortar lined in accordance with ANSI A21.4. Linings shall be standard thickness.

C. For Poly Vinyl Chloride (PVC) Pipe:

1. For Pipe Less Than 4-Inch Diameter: Screw-joint conforming to the requirements of ASTM D1785, threaded to conform to the requirements of ASTM D2464 for use with Schedule 80 pipe and fittings only, all other pipe less than 4-inch diameter shall be elastomeric-gasket bell and socket fittings with built-in stops, pipe ends tapered to fit the socket or elastomeric-gasket couplings with built-in stops, pipe end tapered to fit the coupling. Gasket shall conform to the requirements of ASTM D1869.

2. For Pipe 4-Inch Through 12-Inch Diameter: Fittings and specials shall be cast iron, bell end in accordance with ANSI A21.10, 150 pounds per square inch pressure rating unless otherwise shown or specified, except that profile of bell may have special dimensions as required by the pipe manufacturer; or may be fittings and specials of the same material as the pipe with elastomeric gaskets, all in conformance with the requirements of AWWA C900. Fittings and specials shall be cement-mortar lined (standard thickness) in accordance with ANSI A21.4. Fittings shall be for bell and spigot pipe or plain end pipe, as applicable.

2.04 Couplings:

A. Dielectric fittings shall be installed between threaded ferrous and nonferrous metallic pipe, fittings and valves, except where corporation stops join mains. Dielectric fittings shall prevent metal-to-metal contact of dissimilar metallic piping elements and shall be suitable for the required working pressure.

2.05 Valves:

A. Gate valves shall conform to AWWA C500 and be designed for a working pressure of not less than 150 pounds per square inch. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of opening.

2.06 Valve Boxes: Valve boxes shall be cast iron. Cast iron boxes shall be extension type with slide-type adjustment and with flared base. The minimum thickness of metal shall be 3/16 inch. The word "WATER" shall be cast in the cover. The boxes shall be of such lengths as will be adapted, without full extension, to the depth of cover required over the pipe at the valve location. Locking covers required.

2.07 Fire Hydrants:

A. Fire Hydrants shall be 5 1/4" dry barrel, Traffic breakable - AWWA C502, refer to Drawings.

2.08 Miscellaneous Items:

A. Corporation stops shall have standard corporation stop thread conforming to AWWA C800 on the inlet end, with flanged joints, compression pattern flared tube couplings, or wiped joints for connections to goosenecks.

B. Goosenecks: Copper tubing for gooseneck connections shall conform to the applicable requirements of ASTM B88, K annealed. Length of cable requirements connections shall be in accordance with standard practice.

C. Service stops shall be water-works inverted-ground-key type, oval or round flow way, tee handle, without drain. Pipe connections or compression-pattern flared tube couplings, and be designed for hydrostatic test pressure not less than 200 pounds per square inch.

D. Service boxes shall be cast iron. Extension service boxes of the required length and having either screw or slide-type adjustment shall be installed at all service box locations. The boxes shall have housings of sufficient size to completely cover the service stop and shall be complete with identifying covers.

E. Disinfection: Chlorinating materials shall conform to:
   1. Chlorine, Liquid: AWWA B301.
   2. Hypochlorite, Calcium and Sodium: AWWA B300.

F. Polyethylene Encasement: AWWA C105.

SECTION 02551 - WATER LINES

Part 3 - Execution:

3.01 **Pipe Burial Depth: refer to Plumbing Drawings.**

3.02 Handling: Pipe and accessories shall be handled so as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner. No other pipe or material of any kind shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for alining or turning pipe will be permitted only on the bare ends of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Government. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place. Poly vinyl chloride pipe and fittings shall be handled and stored in accordance with the manufacturer's recommendations. Storage facilities shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325M.

A. Polyethylene encasement shall be used on buried ductile iron piping valves and fittings.

3.03 Cutting of Pipe: Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Architect, cutting shall be done with an approved type mechanical cutter. Wheel cutters shall be used when practicable. Copper tubing shall be cut square and all burrs shall be removed.

3.04 Adjacent Facilities:

A. Sewer Lines: Where the location of the water pipe is not clearly defined in dimensions on the Drawings, the water pipe shall not be laid closer horizontally than 10 feet from a sewer except where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, in which case the water pipe shall not be laid closer horizontally than 6 feet from the sewer. Where water lines cross under gravity-flow sewer lines, the sewer pipe for a distance of at least 10 feet each side of the crossing shall be fully encased in concrete or shall be made of pressure pipe with no joint located within 3 feet horizontally of the crossing. Water lines shall in all cases cross above sewage force mains or inverted siphons and shall be not less than 2 feet above the sewer main. Joints in the

sewer main, closer horizontally than 3 feet to the crossing, shall be encased in concrete.

B. Water lines shall not be laid in the same trench with sewer lines, gas lines, fuel lines, or electrical wiring.

C. Copper tubing shall not be installed in the same trench with ferrous piping materials.

D. Nonferrous Metallic Pipe: Where nonferrous metallic pipe, e.g., copper tubing, crosses any ferrous piping material, a minimum vertical separation of 12 inches must be maintained between pipes.

3.05 Joint Deflection:

A. Ductile-Iron Pipe: The maximum allowable deflection will be as given in AWWA C600. Table 1 shows maximum deflection for 18 feet lengths of pipe. For other lengths the deflection will vary proportionately.

TABLE 1. DEFLECTION IN INCHES

Diameter In Inches	Push-On Joint Pipe	Bell-and-Spigot Joint Pipe	Mechanical Joint Pipe
3	19	22.2	31
4	19	16.7	31
6	19	16.7	27
8	19	14.6	20
10	19	14.0	20
12	19	11.9	20
14	11	10.1	13.5
16	11	8.8	13.5

B. Poly Vinyl Chloride (PVC) Pipe: Maximum offset in alignment between adjacent pipe joints shall be as recommended by the manufacturer and approved by the Architect, but in no case shall it exceed 5 degrees.

3.06 Placing and Laying: Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Under no circumstances shall any of the waterline materials be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe coating. Except where necessary in making connections with other lines or as authorized by the Architect, pipe shall be laid with the bells facing in the direction of laying. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relayed. Pipe that has the grade or shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joining is completed. When work is not in

progress, open ends, of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner. Pipe ends left for future connections shall be valved, plugged, or capped and anchored as shown.

A. Connections: Where connections are made between new work and existing mains, the connections shall be made by using specials and fittings to suit the actual conditions. Standards methods are available for making connections to various types of pipe, made under pressure, these connections shall be installed as approved by the Architect.

B. Pipe passing through walls of valve pits and structures shall be provided with cast-iron wall sleeves. Annular space between walls and sleeves shall be filled with rich cement mortar. Annular space between pipe and sleeves shall be filled with mastic.

3.07 Jointing:

A. Copper Tubing: Joints shall be made with flared fittings. The flared end tube shall be pulled tightly against the tapered part of the fitting by a nut which is part of the fitting, so there is metal-to-metal contact.

B. Ductile-Iron Pipe: Mechanical and push-on type joints shall be installed in accordance with AWWA C600, modified as necessary by the recommendations of the manufacturer to provide for special requirements of ductile-iron pipe.

C. Poly Vinyl Chloride (PVC) Plastic Pipe:

1. Pipe Less Than 4-Inch Diameter: Threaded joints shall be made by wrapping the male threads with approved thread tape or applying an approved thread lubricant, then threading the joining members together. The joint shall be tightened using strap wrenches to prevent damage to the pipe and/or fitting. To avoid excessive torque, joints shall be tightened no more than two threads past hand-tight. Preformed rubber-ring gaskets for elastomeric-gasket joints shall be made in accordance with requirements of AWWA C600 and AWWA C603, as applicable, and as required herein. All pipe ends for push-on joints shall be beveled to facilitate assembly and marked to indicate when the pipe is fully seated. The gasket shall be pre-lubricated to prevent displacement. Care shall be exercised to assure the gasket and ring groove in the bell or coupling match. The manufacturer of the pipe or fitting must also supply the elastomeric gasket. Couplings shall be provided with stops or centering rings to assure that the coupling is centered on the joint.

2. Pipe 4-Inch Through 12-Inch Diameter: Joints shall be elastomeric gasket as specified in AWWA C900. Joints utilizing or requiring solvent-cement will not be accepted. Jointing procedure shall be specified for pipe less than 4-inch diameter with configuration utilizing elastomeric ring gasket.

D. Polyethylene Pipe: Joints shall be made in accordance with the recommendations of the manufacturer.

E. Connections between different types of pipe and accessories shall be made with transition fittings approved by the Architect.

3.08 Service Lines: Service lines shall include the lines to and connections with the building service at a point approximately 5 feet outside the building where such building services are not installed, the Contractor shall terminate the service lines approximately 5 feet from the site of the proposed building at a point designated by the Architect. Such service lines shall be closed with plugs or caps. All services stops and valves shall be provided with extension service boxes of the lengths required by the depth of service line stops or valves. Service lines shall be constructed in accordance with the following requirements:

A. Service lines 2 inches and smaller shall be connected to the main by a direct-tapped corporation stop or by a service clamp. A corporation stop and a copper gooseneck shall be provided with either type of connection. Maximum sizes for directly-tapped corporation stops and for outlets with service clamps shall be as in Table II.

TABLE II. SIZE OF CORPORATION STOPS AND OUTLETS

Pipe Size Inches	Corporation Stops, Inches For Cast Iron Inches Pipe	Outlets W/Service Clamps, Single & Double Straps
3	---	1
4	1	1
6	1-1/4	1-1/2
8	1-1/2	2
10	1-1/2	2
12 & Larger	2	2

Where two or more gooseneck connections to the main are required for an individual service, such connections shall be made with standard branch connections. The total clear area of the branches shall be at least equal to the clear area of the service which they are to supply.

1. Service lines 1 1/2 inches and smaller shall have a service stop.
2. Service lines 2 inches in size shall have a gate valve.

B. Service lines larger than 2 inches shall be connected to the main by a rigid connection and shall have a gate valve.

3.09 Tapped Tees and Crosses: Tapped tees and crosses for future connections shall be installed where shown.

3.10 Thrust Blocks: Plugs, caps, tees and bends deflecting 22 1/4 degrees or more, either vertically or horizontally, on water-lines 4 inches in diameter or larger, and fire hydrants shall be provided with thrust blocking, as directed. Thrust blocking shall be concrete of a mix not leaner than 1 cement: 2 1/2 sand: 5 gravel and having a compressive strength of not less than 2,000 pounds per square inch after 28 days. Blocking shall be placed between solid ground and the hydrant or fitting to be anchored. Unless otherwise indicated or directed the base and thrust bearing sides of thrust blocks shall be poured directly against undisturbed earth. The sides of thrust blocks not subject to thrust may be poured against forms. The area of bearing shall be as shown or as directed. Blocking shall be placed so that the fitting joints will be accessible for repair.

3.11 Hydrostatic Tests: Where any section of a water line is provided with concrete thrust blocking for fittings or hydrants, the hydrostatic tests shall not be made until at least 5 days after installation of the concrete thrust blocking unless otherwise approved. The method proposed for disposal of waste water from hydrostatic tests and disinfection shall be submitted to the Architect for approval prior to performing hydrostatic tests.

3.12 Pressure Test: After the pipe is laid, the joints completed, fire hydrants permanently installed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of water distribution or water service piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 150 pounds per square inch. Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, valves, and hydrants shall be carefully examined during the partially open trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, valves, or hydrants discovered in consequence of this pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory. The requirement for the joints to remain exposed for the hydrostatic tests may be waived by the Architect when one or more of the following conditions is encountered:

A. Wet or unstable soil conditions in the trench.

B. Compliance would require maintaining barricades and walkways around and across an open trench in a heavily used area that

would require continuous surveillance to assure safe conditions.

C. Maintaining the trench in an open condition would delay completion of the contract.

D. An unforseeable cause which would result in excess cost.

The Contractor may request the waiver, setting forth in writing the reasons for the request and stating the alternative procedure proposed to comply with the required hydrostatic tests. Backfill placed prior to the tests shall be placed in accordance with the requirements of Section 02202, Earthwork for Utilities. Piping and specials requiring replacement, as disclosed by the hydrostatic tests, and all work connected therewith, shall be at the Contractor's expense.

3.13 Leakage Test: Leakage test shall be conducted after the pressure test has been satisfactorily completed. The duration of each leakage test shall be at least 2 hours. Test pressure shall be at least 50 psi greater than maximum System pressure (minimum of 100 psi). Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. No piping installation will be accepted until the leakage is less than the number of gallons per hour as determined by the formula.

$$L = 0.00054\ ND\ /P$$

In which L equals the allowable leakage in gallons per hour; N is the number of joints in the length of pipeline tested; D is the nominal diameter of the pipe in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge. The allowable leakage in gallons per hour, per joint at 100 pounds per square inch average test pressure shall be as in Table III.

TABLE III. ALLOWABLE LEAKAGE, LIMITS

Pipe Diameter (Inches)	Gallons Per Hour
2	0.0108
3	0.0162
4	0.0216
6	0.0324
8	0.0432
10	0.0540

Should any test of pipe disclose leakage greater than that specified in the foregoing table, the defective joints shall be located and repaired until the leakage is within the specified allowance, without additional cost to the Government.

3.14 Time for Making Test: Except for joint material setting or where concrete reaction backing necessitates a 5-day delay, pipelines jointed with rubber gaskets, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill.

3.15 Concurrent Hydrostatic Tests: The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures. Regardless of the sequence of tests employed, the results or pressure tests, leakage test, and disinfection shall be satisfactory as specified. All replacement, repair, or retesting required shall be accomplished by the Contractor at no additional cost to the Government.

A. Pressure test and leakage test may be conducted concurrently.

B. Hydrostatic tests and disinfection may be conducted concurrently using the water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be reaccomplished.

3.16 Disinfection: Before acceptance for potable water operation, each unit of completed water distribution line and water service line shall be disinfected as specified herein. After pressure tests have been made, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. The chlorinating material shall be either liquid chlorine, calcium hypochlorite, or sodium hypochlorite, conforming to paragraph Products. The chlorinating material shall provide a dosage of not less than 50 parts per million and shall be introduced into the water lines in an approved manner. Poly vinyl chloride (PVC) pipe lines shall be chlorinated using only the above specified chlorinating material in solution. In no case will the agent be introduced into the line in a dry solid state. The treated water shall be retained in the pipe long enough to destroy all non-spore-forming bacteria. Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 10 p.p.m of chlorine throughout the line at the end of the retention period. All valves on the lines being disinfected shall be opened and closed several times during the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 p.p.m. During the flushing period, each fire hydrant on the line shall be opened and closed several times. From several points in the unit,

the Contractor will take samples of water in properly sterilized containers for bacterial examination. The disinfection shall be repeated until tests indicate the absence of pollution for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained.

3.17 Clean-Up: Upon completion of the installation of the water distribution lines, water service lines, irrigation system, and appurtenances, all debris and surplus materials resulting from the work shall be removed.

End of Section

DIVISION 2 – SITE WORK

SECTION 02741 - HOT MIX ASPHALT PAVING and SEAL COAT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract and Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Hot-mix asphalt paving.
   2. Hot-mix asphalt patching.
   3. Pavement-marking paint.
   4. Subgrade modification.
   5. Asphalt seal and FOG coat.

B. Related Sections include the following:
   1. Division 2 Section "Earthwork".

1.3 QUALITY ASSURANCE

A. STATE OF OKLAHOMA, DEPARTMENT OF TRANSPORTATION, Standard Specifications for Construction and Materials, Current standards, as amended to date.

B. Current ODOT Standards are available at the following website address: http://www.odot.org/c manuals/specbook/oe ss 2009.pdf

C. 36 CFR 1191 American with Disabilities Act and Architectural Barriers Act Accessibility Guidelines.

D. American Society of Testing Materials

   1. ASTM D-2939 Standard Test Methods Emulsion Bitumen's Use as Protective Coatings

   2. ASTM D-3405 Joint Sealant Hot-Applied for Concrete and Asphalt Pavement

   3. ASTM D-3320 Emulsified Coal Tar Pitch (Mineral Colloid Type

SECTION 02741 - HOT MIX ASPHALT PAVING and SEAL COAT

1.4 SYSTEM DESCRIPTION

A. Provide hot-mix asphalt paving according to materials, workmanship, and other applicable requirements of standard specifications for patching/repair of existing paving.

B. Cleaning and preparing the pavement surface, mixing the pavement sealer, and applying asphalt pavement sealer of existing bituminous pavement surfaces.

C. Restriping parking lot markings for an existing parking lot for maintenance and repair application. Areas to receive parking lot markings are all areas within the property boundary.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties (all test results must be current – within the last 12 months).

B. Job-Mix Designs: Certification of approval of job mix proposed for the Work (mix must be current – within the last 12 months).

C. In place material testing procedures – refer to Section 3.11 for testing requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Manufacturer shall be Oklahoma Department of Transportation (ODOT) approved paving-mix manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated, as documented according to ASTM E 548.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing

manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:
   1. Prime and Tack Coats: Minimum surface temperature of 40 deg F.
   2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
   3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Coarse and Fine Aggregate: shall be in accordance with the requirements of ODOT Standards for Construction, as amended to date, for hot-mixed asphalt.

2.2 ASPHALT MATERIALS

A. Prime Coat: ASTM D 2027, medium-curing cutback asphalt, MC-30 or MC-70.

B. Tack Coat: AASHTO M 140, emulsified asphalt slow setting, diluted in water, of suitable grade and consistency for application – ASHTO MP1.

C. Water: Potable.

2.3 STABILIZED SUBGRADE MATERIAL

A. Hydrated Lime Material: Shall meet the requirements of ASTM C 977. Top 8” of substrate shall be amended at a rate of 5 – 7% hydrated lime.

B. At the time of hydrated lime stabilization placement, the contractor shall coordinate with the testing agency to

observe and provide on-site testing during application. This is required to ensure the proper amount of hydrated lime is mixed and the recommended subgrade modification is achieved.

C. Compact to a minimum 95 percent optimum density in accordance with ASTM D 698, or 92 percent optimum density in accordance with ASTM D 1557, unless otherwise required by the Geotechnical Report which is a part of these Contract Documents.

2.4 AUXILIARY MATERIALS

A. Joint Sealant: ASTM D 3405 or AASHTO M 301, hot-applied, single-component, polymer-modified bituminous sealant as manufactured by:

a. Crafco Inc
b. W.R. Meadows, Inc.
c. Or approved equal

B. Color: Joint color shall match pavement color. Contractor shall submit color sample to Owner for approval

C. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

2.5 MIX

A. Hot-Mix – Hot Lay Asphalt:
1. Oklahoma Department of Transportation (ODOT) Type "A" Asphalt Concrete:

Sieve Size (inch)	**Passing (%)**
1-1/2"	100
1	90-100
3/4	-
1/2	70-90
3/8	-
No. 4	40-65
No. 10	25-45

No. 40	10-26
No. 200	-

Asphalt Cement
% of mix mass 3.8 – 6.5

2. Oklahoma Department of Transportation (ODOT) Type "B" Asphalt Concrete:

Sieve Size (inch)	**Passing (%)**
1-1/2"	-
1	-
3/4	100
1/2	90-100
3/8	70-90
No. 4	45-70
No. 10	25-50
No. 40	12-30
No. 200	7-20

Asphalt Cement
% of mix mass 4.7 – 7.5

2.6 ASPHALT SEAL AND FOG COAT

A. SealMaster Polymer Modified Coal Tar Sealer (PMCTS).
B. Oil Spot Treatment: SealMaster PetroSeal or prep seal oil spot primer as specified by the manufacturer for pavement sealer.
C. Water.
D. Aggregate or sand as required and specified by the manufacturer.
E. Polymer Additive (optional).
F. Fortifier: water based epoxy-latex additive, designed as a fortifier for refined coal tar emulsions to increase resistance to power steering marks, fuel and chemical effects to assist in fast drying of the coating is acceptable. Thickeners only are not permitted.
G. Self-propelled squeegee equipment shall have at least 2 squeegee or brush devices to assure adequate distribution and penetration of sealer into the bituminous pavement. Equipment shall have continuous agitation or mixing capabilities to maintain homogenous consistency of pavement sealer mixture

throughout the application process. Pressurized spray application equipment shall be capable of spraying pavement sealer with sand added. Equipment shall have continuous agitation or mixing capabilities to maintain homogenous consistency of pavement sealer mixture throughout the application process. Hand squeegee and brushes shall be acceptable only in areas where practicality prohibits the use of mechanized equipment.

H. Mix Designs:
   1. Sealer concentrate – 100 gallon
   2. Silica Sand 400 Meeting 40 to 60 fineness rating (AFS). Black Beauty Slag Sand with comparable sieve rating may be substituted when silica sand is not available.
   3. Water – specified material does not require onsite dilution.
   4. Fortifier 3%.
   5. Curing agents on high traffic areas (when applicable).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads. Contractor shall verify proper moisture.

B. Proof-roll subbase using a loaded, tandem-axle dump truck weighing at least 25 tons to locate areas that are unstable or that require further compaction. Amend substrate below all paving with lime stabilization as per Geotechnical Report which is a part of this Project Manual, and as described above.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate

surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure for 72 hours minimum.
   1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
   2. Protect primed substrate from damage until ready to receive paving.

3.3 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

   1. Place Type “A” hot-mix asphalt base course in number of lifts (maximum 3-inch lift) and thicknesses required for a total thickness of 5”.
   2. Place Type “B” hot-mix asphalt surface course in single lift (maximum lift height: 3-inches) for a total thickness of 3”.
   3. Spread mix at minimum temperature of 250 deg F.
   4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.
   5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
   1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap

previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.
   1. Clean contact surfaces and apply tack coat to joints.
   2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
   3. Offset transverse joints, in successive courses, a minimum of 24 inches.
   4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."
   5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
   6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.
   1. Asphalt material behind the laydown machine shall be a minimum of 250°F and complete compaction before mix temperature cools to below 180° F.
   2. Minimum surface temperatures for compacted lift thickness:
      a. Less than 1-1/2 inch – minimum 50°F
      b. 1-1/2 inch to 3 inches – minimum 45°F
   3. Steel wheeled compactors shall weigh at least 10 tons (maximum speed 2.50mph)

4. Pneumatic tired compactors (maximum speed 3mph) shall have at least seven pneumatic tires of equal size and diameter. They shall be constructed so that their total weights shall be varied to produce an operating weight of at least 3,500 pounds per tire.
5. Use Pneumatic tired rollers on all lifts following the initial roller with a steel roller and before finishing with a steel wheel roller. A minimum of two coverages with the pneumatic tired roller is required on each lift.
6. Compaction requirements shall be in accordance with the current ODOT standards.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
1. Average Density: 96 percent of reference laboratory density according to AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:
   1. Base Course: Plus or minus 1/2 inch.
   2. Surface Course: Plus 1/4 inch, no minus.

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
   1. Base Course: 1/4 inch.
   2. Surface Course: 1/8 inch.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports. Testing agency shall be certified in all ASTM and AASHTO test required for this project.

   1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
   2. Testing frequency as listed below:

Asphalt Extraction and Gradation	1,000 tons Asphalt Pavement
Roadway Density of Asphalt Mix	4 Per 2,000 Tons Asphalt Pavement (not less than 1 per day of laydown)
Hveem Stability Test and Density of Molded Specimen	1 Per 2,000 Tons Asphalt Pavement
Maximum Theoretical Specific Gravity of Asphalt Mix	1 Per 2,000 Tons Asphalt Pavement

B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

1. Tolerance: 1/8 inch in 10 feet
2. All pavement will be subject to straightedge inspection during construction operations. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall at no point exceed the tolerance listed above.

E. In-Place Density: Testing agency will take samples of un-compacted paving mixtures and compacted pavement according to specifications.

1. The target density of each lot shall be 94% of the Maximum Theoretical Specific Gravity at the job mix formula asphalt content determined by the most recent specific gravity of the bituminous paving mixture in accordance with AASHTO T209.
2. The roadway density for each lot will be the average of tests of three separate specimens taken randomly within the limits of the area represented by the lot.
3. Average lot density tolerance: 91% to 97% of Maximum Theoretical Density.

F. Remove and replace hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

G. Coring of pavement: If core drilling is determined necessary, the following will be followed:

1. Minimum of three cores for each section of questionable pavement.
2. Obtain 3-1/2 inch diameter cores.
3. Obtain a length of 1.50 times the diameter.

4. Condition cores based on current version of ACI 318 and ASTM C 42.

3.7 EXECUTION – PAVEMENT SEALER

A. Apply pavement sealer when ambient temperature is 50 degrees F and rising for a period of 24 hours after application. Do not apply when temperature is expected to drop below 50 degrees F in a 24-hour period. Do not apply if rain is imminent within 8 hours. Do not apply pavement sealer when ambient temperature is 90 degrees F and above without first cooling the surface with a fine mist of water (fogging). The fogging should only dampen the surface without causing puddling. Between September 15th and May 1st, check the specifications and requirements of the State Department of Transportation WEATHER LIMITATIONS on the permitted dates of applying the seal coats.

B. Surface Preparation:

1. Surface must be free from dirt, dust, and includes grass along the edges. Remove and dispose of any loose and unsuitable materials, dirt, and debris from pavement surface by power blower or mechanical sweeping equipment.
2. Surface hairline cracks up to 0.50” must be filled with crack filler; cracks larger than 0.5” must be cleaned and filled with elastomeric emulsion crack filler.
3. Potholes, alligator areas, and similar surface defects must be cut out and repairs made.
4. Treat all grease, oil, and gasoline spots with compatible primer of the manufactured coating. In hot weather, the surface shall be fogged with water prior to sealing.
5. Prior to spreading pavement sealer, paint all existing paint stripes with black paint.
6. Contractor to dispose of all cans, bags, and leftover materials off-site.

C. Application:

1. Mix pavement sealer in accordance with the manufacturer’s procedure to a uniform consistency before using. First and second coat all parking areas at a

rate of 13 gallons per square yard per coat. At no time are total coats to exceed 0.51 gallons per square yard.

2. Allow a minimum of 24 hours of curing time before allowing traffic over treated surface or application of traffic marking paint. Use solvent borne paint shall not be permitted.
3. Lines, stencils, and markings shall be painted as per the Drawings.
4. It is the Construction Manager's responsibility to check local zoning codes and regulations.
5. All seal coat and striping projects must be performed during available time periods that do not interfere with other construction operations.

3.8 DISPOSAL

A. Except for material indicated to be recycled, excessive asphalt, etc. shall be removed from the Project site and legally disposed of.

END OF SECTION

DIVISION 2 - SITE WORK

SECTION 02900 - TURF ESTABLISHMENT

Part 1 - GENERAL

1.01 Summary:

A. This section generally describes the work, equipment, and materials required to furnish and landscape the site. The Contractor shall provide all necessary labor, equipment and materials to construct and complete site work landscaping. All work shall be completed in conformance with the recommendations of plant material suppliers.

B. As a minimum, the Contractor must be able to provide the following materials and services:

1. Supply and grade of fill material
2. Environmentally approved control/elimination of weeds/grasses.

1.02 References:

A. Drawings and general provisions of the Project Manual and Contract, including General and Supplementary Conditions and Division I Specification sections, apply to Work of this Section.

1.03 Submittals:

A. Architect approval is required. The following shall be provided:

1. Pesticide and Herbicide Treatment Plan, giving proposed sequence of pesticide and herbicide treatment work, before work is started. The pesticide and herbicide trade name, chemical composition, formulation, concentration, application rate of active ingredients and methods of application for all materials furnished, and the name and state license number of the state certified applicator shall be included.
2. Certificates of compliance certifying that materials meet the requirements specified, prior to the delivery of materials. Reports for the following materials shall be included:
   a. Fertilizer: For chemical analysis and composition percent.
   b. Pesticide and Herbicide Material: For EPA registration number and registered uses.

1.04 Quality Assurance:

A. All plant materials shall be guaranteed for one (1) year, following Architect=s acceptance of the project.

B. The Contractor shall maintain the project by weeding, watering, and other tasks as required, through final acceptance of the project by the Owner. Weeds, trimmings, etc. shall be removed from the site on the day work is performed and the area cleaned. Contractor shall immediately replace any and all defective

components or dead or dying plant materials.

C. The Architect shall inspect all planting materials upon delivery to the site and reserves the right to reject any or all materials which do not conform to the intent of this specification.

1.05 Delivery, Storage and Handling:

A. Pesticide and herbicide materials shall be delivered to the site in the original unopened containers bearing legible labels indicating the Environmental Protection Agency (EPA) registration numbers and the registered uses.

B. Sod not installed on the day of arrival at the site shall be stored and protected in areas designated by the Architect. Sod shall be protected from exposure to wind and shall be shaded from the sun. Covering that will allow air to circulate and prevent internal heat from building up shall be provided. All sod shall be kept in a moist condition by watering with a fine mist spray until planted.

C. Soil amendments shall be stored in dry locations away from contaminants. Pesticide and herbicide materials shall not be stored with other landscape materials. Storage of materials shall be in areas designated or as approved by the Architect.

D. Care shall be taken to avoid injury to sod. Materials shall not be dropped from vehicles.

Part 2 - Products

2.01 Materials:

A. Plants:

1. Turf grass shall be Bermuda sod. Sod shall be freshly cut (no more than 5 days). Water all areas to receive sod 1/4" less than 24 hours prior to installation of new sod. Sod all disturbed and exposed soil within the project limits as indicated on the Drawings.
2. Substitutions will not be permitted without written request from the Contractor for approval by the Architect.
3. Sod shall be grown under climatic conditions similar to those in the locality of the project.

2.02 Topsoil:

A. Acceptable topsoil includes selectively excavated material that is representative of soils in the vicinity that produces growth of grass typical of the project area. Topsoil should be reasonably free from underlying subsoil, clay lumps, objectionable weeds, litter, brush, matted roots, toxic substances or any material that might be harmful to plant growth or be a hindrance to grading, planting, or maintenance operations. Topsoil shall not contain more than five percent

by volume of stones, stumps or other objects larger than 3/4 inch in any dimension.

2.03 Fertilizer:

A. The commercial grade of fertilizer shall be suitable for the locations and season approved by the Architect. The P-N-K content shall be determined on the basis of soil conditions and the plants involved.

B. Prepackaged fertilizer delivered to the site shall be packaged in new, sealed, clean containers which bear a label fully describing the contents, the chemical analysis of each nutrient, the fertilizer grade, the net bulk, and the brand name and address of the manufacturer. Bulk fertilizer delivered to the site shall be accompanied with certification describing the contents, the chemical analysis of each nutrient, the fertilizer grade, the net bulk, and the brand name and address of the manufacturer. No fertilizer which becomes caked or otherwise damaged will be accepted.

2.04 Water:

A. Water shall not contain elements toxic to plant life.

B. The Contractor is responsible for ensuring that new lawns are adequately watered at all times.

C. During prolonged periods of drought, watering guidelines established by local water district shall apply.

Part 3 - Execution

3.01 Examination:

A. The Architect shall verify the finished grades are as indicated on drawings, and the placing of topsoil and smooth grading has been completed.

B. The location of underground utilities and facilities shall be verified. Damage to underground utilities and facilities shall be repaired at the Contractor's expense.

3.02 Site Preparation:

A. Prior to placing topsoil, the ground surface shall be cleared of all brush, snags, and rubbish.

B. Previously constructed grades shall be repaired if necessary so that areas to be topsoiled conform to the final grades upon completion of topsoil placement.

C. The topsoil shall be uniformly distributed on the designated areas and evenly spread to a minimum thickness of 6 inches. The spreading shall be performed in such a manner that planting can proceed with little additional soil preparation or tillage. The surface resulting from topsoiling shall meet the finish surface requirements as specified. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry,

or in a condition otherwise detrimental to proper grading or the proposed planting.

D. All topsoiled areas covered by the project shall be uniformly smooth graded. The finished surface shall be reasonably smooth and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations. The finished surface shall be free of depressed areas where water would pond.

3.03 Application of Pesticide Material:

A. When pesticide becomes necessary to remove a disease or pest, a state-certified applicator shall apply required pesticide in accordance with State EPA label restrictions and recommendations. Hydraulic equipment shall be provided for the liquid application of pesticides with a leak-proof tank, positive agitation methods, controlled application pressure and metering gauges. A pesticide treatment plan shall be provided to the Architect as specified in paragraph SUBMITTALS.

3.04 Restoration and Clean Up:

A. Planting areas, pavements and facilities that have been damaged from the planting operation shall be restored to original condition at the Contractor's expense.

B. Excess and waste material from the planting operation shall be removed and disposed of off the site. Adjacent paved areas shall be cleared.

End of Section

DIVISION 2 – SITE WORK

SECTION 02910 – TEMPORARY EROSION CONTROL

Part 1 – General

1.01 Work Included: The work under this section of the Specifications shall include all temporary erosion control measures including, but not necessarily limited to, rapid stabilization, rock entrance, silt fence, bale checks, bio rolls, and interim mulch as may be necessary to control soil erosion and sedimentation. The work shall include furnishing all materials, labor and equipment required for the construction and maintenance of erosion and sediment control devices as shown on the Drawings or as directed by the Architect. The work shall also include all inspections and reports as required by the storm water discharge permit for construction activities.

1.02 Reference Specifications:

A. The erosion prevention requirements of the City of Moore shall be considered as a part of this Specification.

B. All testing required by the Jurisdiction Having Authority shall be performed by the independent testing laboratory retained by the Contractor. The costs of said testing shall be borne by the Contractor.

1.03 Stormwater Pollution Prevention – General Permit: if a Permit is required by the local Jurisdiction Having Authority, it shall be obtained from said authority and all fees and/or costs shall be paid by the Contractor.

A. The Contractor will furnish a copy of the completed application package and General Permit to the Architect.

B. The back and side lot ditches shall be sodded immediately after they have been graded and top soil spread.

Part 2 – Products

2.01 Erosion Control Blankets: Erosion control blankets shall conform to applicable requirements.

2.02 Silt Fence: refer to the Drawings.

A. The geotextile fabric shall be free of flaws such as tears or other defects. Any geotextile fabric which becomes damaged shall be replaced. The geotextile fabric shall meet or exceed the following requirements:

1.	Grab Strength (ASTM D 4632)	100 lbs.
2.	Apparent Opening Size (ASTM D 4751)	20 - 70 sieve range
3.	Width	36 inches

Part 3 - Execution

3.01 General:

A. Temporary erosion control measures such as erosion control blankets, bio rolls, rock entrance, and silt fences shall be coordinated with the site work and turf establishment. No site work will be permitted until ALL necessary temporary erosion control measures are completed and in place in order to prevent excessive soil erosion and subsequent siltation from entering wetlands, streams or storm sewers. The construction of erosion control measures shall not relieve the Contractor of the responsibility for preventing or minimizing the potential for erosion or siltation. The Contractor shall be responsible for all damages and clean up and the costs therefore, resulting from erosion of the soils and any siltation which may occur, regardless of the temporary erosion control measures taken.

B. The alignment and location of erosion control measures shall be as show on the Drawings or as directed by the Architect. Minimum measures are shown on the Drawings. The Contractor shall incorporate further measures into the work as the Contractor's progress may dictate. Inspections of the temporary erosion control measures and reports thereof, shall be made by the Contractor in accordance with the storm water discharge permit for construction activities.

C. Structural practices:

1. Perimeter Ditches – Perimeter ditches will be installed to collect runoff from the disturbed area and direct runoff to the sedimentation basin.

D. Rapid stabilization shall be used in the following areas as well as the areas shown on the Plans.

1. Disturbed areas around culvert inlets and streams.
2. Ditches draining from the construction sites.
3. Disturbed slopes near storm drain inlets.

3.02 Timing of Controls/Measures: Any ditches and stabilized construction entrances shall be constructed prior to grading of any other portions of the site. Areas where construction

activity temporarily ceases for more than 21 days will be stabilized with a temporary seed and mulch within 14 days of the last disturbance. Once construction activity ceases permanently in an area, that area will be stabilized with permanent sod turf.

3.03 Removal of Temporary Erosion Control: Temporary erosion control devices shall remain in place until the permanent measures (turf establishment) have become established as determined by the Architect. All areas disturbed by the removal of temporary erosion control measures shall receive the same turf establishment as the areas adjacent thereto.

3.04 Installation Requirements:

A. Bio Rolls shall be installed as required to reduce erosion.

B. Silt Fence shall be constructed on 2 x 2 wood posts that are spaced no more than 6 feet and embedded no less than 2.0 feet. The geotextile fabric shall be secured to the upstream face of the posts. The geotextile fabric shall be embedded in an anchor trench along the upstream side of the silt fence. The anchor trench shall be 12 inches deep by 12 inches wide and shall extend the full length of the silt fence. The geotextile fabric shall line both sides and the bottom of the anchor trench. The anchor trench shall be backfilled with the excavated material, which shall be firmly compacted into place.

C. Rate of slurry application shall be variable depending on surface roughness, slope configuration and degree of undulation but it is expected that 6 M gallons per acre. This rate is equivalent to applying Type 6 Hydraulic Soil Stabilizer at 2100 pounds per acre. Amount of material applied shall be such to obtain 100% soil surface coverage. In inaccessible areas, the mix may be pumped through a hose. To obtain coverage, two (2) passes may be necessary. In inaccessible areas, the mix may be pumped through a hose.

3.05 Maintenance:

A. It shall be the Contractor’s responsibility to maintain all erosion control measures and to inspect same after each rainfall event. All displaced bio rolls shall be replaced and silt fences shall be repaired where sagging or otherwise damaged. The Contractor shall review the temporary erosion control measures and make revisions as necessary in order to minimize damage due to future rainfalls. All costs of temporary erosion control shall be considered incidental and the responsibility of the Contractor.

B.The rock entrances may need occasional maintenance to prevent the tracking of mud onto paved roads. This may

require periodic top-dressing with additional rock or removal and reinstallation of the entrances. The cost of maintenance of rock entrances shall be the responsibility of the Contractor.

3.06 Waste Disposal:

A. Waste Materials: All waste materials will be disposed of as described in the "Construction Storm Water Pollution Prevention Plan".

3.07 Offset Vehicle Tracking: One (1) stabilized construction entrances shall be constructed to help reduce vehicle tracking of sediments. The paved parking lot adjacent to the site entrance shall be swept as needed to remove any excess mud, dirt or rock tracked from the site. Dump trucks hauling material from the construction site shall be covered with a tarp.

3.08 Maintenance/Inspection Procedures:

A. Erosion and Sediment Control Inspection and Maintenance Practices:

1. All control measures will be inspected at least once each week and following any storm event of 0.5 inches or greater.
2. All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.
3. Build up sediment will be removed from silt fence when it has reached one-third the height of the fence.
4. Silt fence will be inspected for depth of sediment, tears, to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in the ground.
5. Ditches will be inspected and any erosion promptly repaired.

B. Non-Storm Water Discharges: All non-storm water discharges will be directed to a location selected by the Contractor and approved by the Architect. It is expected that the following non-storm water discharges will occur from the site during the construction period:

1. Water from water line flushing.
2. Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
3. Uncontaminated groundwater (from dewatering excavation).

3.09 Spill Prevention:

A. Material Management Practices.

The following good housekeeping practices shall be followed onsite during the construction project.

1. Good Housekeeping:

The following good housekeeping practices shall be followed onsite during the construction project:

a. An effort shall be made to store only enough product required to do the job.
b. All materials stored onsite shall be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
c. Products shall be kept in their original containers with the original manufacture's label.
d. Substances shall not be mixed with one another unless recommended by the manufacturer.
e. Whenever possible, all of a product shall be used up before disposing of the container.
f. Manufacturers' recommendations for proper use and disposal shall be followed.
g. The site superintendent shall inspect daily to ensure proper use and disposal of materials onsite.

2. Hazardous Products: These practices are used to reduce the risks associated with hazardous materials.
   a. Products shall be kept in original containers unless they are not re-sealable.
   b. Original labels and material safety data shall be retained; they contain important product information.
   c. If surplus product must be disposed of, manufactures' or Local and State recommended methods for proper disposal shall be followed.

B. Product Specific Practices: The following project specific practices shall be followed onsite:

1. Petroleum Products:
   All onsite vehicles shall be monitored for leaks and receive regular preventative maintenance to reduce the change of leakage. Petroleum products shall be stored in tightly sealed containers which are clearly labeled. Any asphalt substances used onsite shall be applied according to the manufacturer's recommendations.
2. Fertilizers:
   Fertilizers used shall be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer shall be worked into the soil to limit exposure to storm water. Storage shall be in a covered shed. The contents of any partially used

bags of fertilizer shall be transferred to a sealable plastic bin to avoid spills.

3. Paints:
   All containers shall be tightly sealed and stored when not required for use. Excess paint shall not be discharged to the storm sewer system but shall be properly disposed of according to manufactures' instructions or State and Local regulations.
4. Concrete Trucks:
   Concrete trucks shall not be allowed to wash out or discharge surplus concrete or drum wash water on the site.

C. Spill Control Practices:
In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices shall be followed for spill prevention and cleanup:

1. Manufacturer's recommended methods for spill cleanup shall be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
2. Materials and equipment necessary for spill cleanup shall be kept in the material storage area onsite. Equipment and materials shall include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
3. All spills shall be cleaned up immediately after discovery.
4. The spill area shall be kept well ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
5. Spills of toxic or hazardous material shall be reported to the appropriate State or Local government agency, regardless of the size.
6. The spill prevention plan shall be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures shall also be included.

End of Section

DIVISION 2 - SITE WORK

SECTION 02920 - LANDSCAPE GRADING

Part 1 -General

1.01 Summary:
- A. This section describes the labor, materials and installation requirements necessary to complete the fine grading, incidental grading, and related items as indicated or specified.

1.02 Site Conditions:
- A. Protect landscaping and other features remaining as final work.
- B. Protect any existing structures, roads, sidewalks, paving and curbs, or other features pertinent to the site in this project.

Part 2 - Products NOT USED

Part 3 - Execution

3.01 Examination:
- A. The areas to be graded will be free of waste or debris developed by other trades.
- B. Contractor shall field verify all dimensions and/or layout prior to starting work.

3.02 Preparation:
- A. Prepare site by applying Round Up, or approved equal, as per label directions to weed growth on site.
  1. Scarify planting areas to a minimum depth of six (6) inches and thoroughly water to settle all soil.

3.03 Grading:
- A. Contractor shall grade all planting areas, swales or other areas as noted on drawings.
  1. Contractor shall provide incidental grading of all areas adjacent to curbs and sidewalks. Provide a finish grade one (1") inch below curbs or sidewalks.
  2. Contractor shall fine grade turf areas, eliminating rough or low areas to ensure positive drainage.
  3. Any other areas not covered specifically above shall be graded to leave a generally smooth appearance conforming to standard landscape practices defined as: The final surface shall be raked; all objectionable materials, trash, brush, weeds, and stones larger than one inch shall be removed from the site and disposed of properly off base.
  4. When sod is being installed, the appropriate sub-grade shall be graded prior to the installation of such materials. See applicable specifications, in any, for additional requirements.

End of Section

DIVISION 3 – CONCRETE

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 Section Includes
- A. Concrete formwork.
- B. Slabs on grade.
- C. Concrete foundation walls and retaining walls.
- D. Concrete reinforcement.
- E. Joint devices associated with concrete work.
- F. Miscellaneous concrete elements, including equipment pads and equipment pits.
- G. Concrete curing.

1.02 Related Requirements
- A. See Section 01 3000 – Administrative Requirements, for submittal procedures.
- B. Section 07 9200 – Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints, construction joints and isolation joints in slabs.

1.03 Reference Standards
- A. For all reference standards listed below, comply with the version year in the governing building code adopted by the Authority Having Jurisdiction. For those reference standards that are not directly referenced by the building code, use the latest edition unless noted otherwise.
- B. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.
- C. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
- D. ACI 301 – Specifications for Structural Concrete.
- E. ACI 302.1R – Guide to Concrete Floor and Slab Construction.
- F. ACI 302.2R – Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
- G. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- H. ACI 305R – Guide to Hot Weather Concreting.
- I. ACI 305.1 – Specification for Hot Weather Concreting.
- J. ACI 306R – Guide to Cold Weather Concreting.
- K. ACI 308R – Guide to External Curing of Concrete.
- L. ACI 318 – Building Code Requirements for Structural Concrete and Commentary.
- M. ACI 347R – Guide to Formwork for Concrete.
- N. ACI SP-66 – ACI Detailing Manual.
- O. ASTM A615/A615M – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- P. ASTM A706/A706M – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

Q. ASTM A1064/A1064M – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
R. ASTM C33/C33M – Standard Specification for Concrete Aggregates.
S. ASTM C39/C39M – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
T. ASTM C94/C94M – Standard Specification for Ready-Mixed Concrete.
U. ASTM C143/C143M – Standard Test Method for Slump of Hydraulic-Cement Concrete.
V. ASTM C150/C150M – Standard Specification for Portland Cement.
W. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete.
X. ASTM C173/C173M – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
Y. ASTM C260/C260M – Standard Specification for Air-Entraining Admixtures for Concrete.
Z. ASTM C494/C494M – Standard Specification for Chemical Admixtures for Concrete.
AA. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
AB. ASTM C1064/C1064M – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
AC. ASTM C1107/C1107M – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
AD. ASTM C1602/C1602M – Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.
AE. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
AF. ASTM D2103 – Standard Specification for Polyethylene Film and Sheeting.
AG. ASTM E1745 – Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
AH. CRSI (DA4) – Manual of Standard Practice.
AI. ICC (IBC)-2015 – International Building Code.

1.04 Definitions

A. Cold Weather: A period when for more than three successive days the average daily outdoor temperature drops below 40 F. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50 F occur during more than half of any 24 hr duration, the period shall no longer be regarded as cold weather.

B. Hot Weather: Hot weather is any combination of the following conditions that tends to impair the quality of freshly mixed or hardened concrete by accelerating the rate of moisture loss and rate of cement hydration, or otherwise causing detrimental results:
   1. High ambient temperature
   2. High concrete temperature
   3. Low relative humidity
   4. Wind speed
   5. Solar radiation

1.05 Submittals

A. See Section 01 3000 – Administrative Requirements, for submittal procedures.

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

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 – Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 26 – Concrete Documents and Inspection.

D. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

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

F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

G. Formwork Design Submittal: As required by authorities having jurisdiction.

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

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

1.06 Quality Assurance

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

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

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

D. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for placement as required by the manufacturer's warranty.

1.07 Warranty

A. See Section 01 3000 – Administrative Requirements, for submittal procedures.

B. See Section 01 7800 – Closeout Submittals, for additional warranty requirements.

C. Slabs with Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.

1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
2. Provide warranty by manufacturer of MVRA matching terms of flooring adhesive or primer manufacturer's material defect warranty.

PART 2 PRODUCTS

2.01 Formwork

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces of trenched footings unless expressly allowed in the General Notes in the structural drawings. Natural rock formations that maintain a stable vertical edge may be used as side forms for below-grade concrete.
3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
4. Form Ties: Cone snap type that will leave no metal within the clear cover zone of the concrete surface as specified in the Minimum Concrete Cover for Cast-in-Place Non-Prestressed Members table included in the General Notes of the structural drawings.

2.02 Reinforcement Materials

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars, weldable.
   1. Unfinished.

C. Reinforcement Accessories:
   1. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (60,000 psi) plain-steel bars, cut true to length with ends square and free of burrs.
   2. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   3. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
      a. Continuous slab bolsters shall be used to support the bottom reinforcing bars of all reinforced slabs-on-grade.
   4. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement of reinforcing steel within 1-1/2 inches of weathering surfaces and for concrete surfaces that will be exposed to view.

D. Fabrication of Reinforcing:
   1. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
   2. Welding of reinforcement is permitted only with the specific approval of Architect/Engineer. Perform welding in accordance with AWS D1.4/D1.4M.
   3. Locate reinforcing splices not indicated on drawings at point of minimum stress.

2.03 Concrete Materials

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

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

C. Fly Ash: ASTM C618, Class C or F.

D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 Admixtures

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

D. Water Reducing Admixture: ASTM C494/C494M Type A.

E. Moisture Vapor Reducing Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs) and formulated to close capillary systems formed during curing to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.
   1. Provide admixture in slabs to receive adhesively applied flooring.
   2. Manufacturers:
      a. Barrier One, Inc; Barrier One Moisture Vapor Reduction Admixture: www.barrierone.com/#sle.
      b. Substitutions: Substitutions shall comply with the use of concrete staining/dye products. See Section 01 6000 – Product Requirements.

2.05 Accessory Materials

A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Grout: Comply with ASTM C1107/C1107M.

2.06 Bonding And Jointing Products

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
B. Epoxy Bonding System:
   1. Complying with ASTM C881/C881M and of Type required for specific application.
C. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.
D. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness.
   1. Material: ASTM D1751, cellulose fiber.

2.07 Evaporation Retarders

A. Evaporation Retarder: Liquid thin film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement. These products provide a protective film shield over plastic concrete, dissipate as soon as the concrete is no longer plastic, and are not curing products.
   1. Manufacturers:
      a. Euclid Chemical Company ; EUCOBAR: www.euclidchemical.com/#sle.
      b. SpecChem, LLC; SpecFilm Concentrate or SpecFilm: www.specchemllc.com/#sle.
      c. W. R. Meadows, Inc ; Evapre or Evapre-RTU: www.wrmeadows.com/#sle.
      d. Substitutions: See Section 01 6000 – Product Requirements.

2.08 Curing Materials

A. Moisture-Retaining Sheet: ASTM C171.
   1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
   2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

B. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.

C. Water: Potable, not detrimental to concrete.

2.09 Concrete Mix Design

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

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete: Refer Structural General Notes for mix requirements for various classes of concrete.

2.10 Mixing

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

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

PART 3 EXECUTION

3.01 Examination

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

3.02 Preparation

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent according to bonding agent manufacturer's instructions.

1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
2. Use latex bonding agent only for non-load-bearing applications.

E. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

F. In locations where new concrete is doweled to existing work, drill holes in existing concrete, clean out drilled holes, inject the adhesive indicated on drawings and/or General Notes, and insert steel dowels, all in accordance with adhesive manufacturer's installation instructions.

G. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade in accordance with manufacturer's instructions, ASTM E1643, ASTM F710 and ACI 302.2R.

1. Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.
2. Lap vapor retarder sheet over footings and seal to previously placed concrete foundations.
3. Lap joints minimum 6 inches (150 mm).
4. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
5. No penetration of vapor retarder is allowed except for reinforcing steel and permanent utilities.
6. Repair damaged vapor retarder before covering with other materials.
7. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.03 Installing Reinforcement And Other Embedded Items

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement, waterstops and other items to be cast into concrete are

accurately placed, positioned securely, and will not interfere with concrete placement.

3.04 Placing Concrete

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 48 hours prior to commencement of placement operations.

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

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

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

G. Finish slab-on-grade and shored elevated floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 Slab Jointing

A. Locate and install joints as indicated on drawings and Slab-On-Grade Schedule or as submitted by Contractor and approved by structural engineer.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler, total height equal to thickness of slab, set flush with top of slab.

1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.

E. Saw Cut Contraction Joints: Saw cut joints shall be installed with early-entry dry-cut saw before concrete begins to cool, within 1 to 4 hours after completing the slab finishing operations; commence in approximately 1 hours in hot weather or approximately 4 hours in cold weather. Use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab. Refer to Slab-On-Grade Schedule in drawings for additional requirements.

3.06 Floor Flatness And Levelness Tolerances

A. An independent testing agency, as specified in Section 01 4000, will inspect finished slabs for compliance with specified tolerances.

B. Maximum Variation of Surface Flatness:

1. Exposed Concrete Floors: 1/4 inch in 10 feet.
2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
3. Under Carpeting: 1/4 inch in 10 feet.

C. Correct the slab surface if surface variations exceed specified tolerances.

D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 Concrete Finishing

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:

1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:

1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
3. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
4. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal (approximately 1/8 inch per foot).

3.08 Curing And Protection

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

B. Uniformly apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss due to evaporation approaching 0.2 lb/sq.ft./h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing. A methodology for calculating the moisture loss due to evaporation is provided in ACI 305.1.

C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than seven (7) days.

D. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

E. Surfaces Not in Contact with Forms:

1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than seven (7) days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for seven (7) days.
   b. Spraying: Spray water over floor slab areas and maintain wet.
   c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
2. Final Curing: The surface shall be protected against rapid moisture loss upon the termination of initial curing by replacing wet burlap or similar coverings with plastic sheets until the surface has dried under the sheets.
   a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.

3.09 Field Quality Control

A. An independent testing agency will perform Special Inspections and field quality control tests as required by

Chapter 17 of ICC (IBC)-2015. The testing outlined below includes some, but not all, of the testing and observations required to meet the Special Inspection provisions of the building code. Refer to the following parts of the structural drawings for additional Special Inspection requirements:

1. Statement of Special Inspection Notes
2. Table 1705.3 titled "Required Special Inspections and Tests of Concrete Construction"

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

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

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

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure four concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed each day.

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

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

H. Air Content: ASTM C173/C173M, one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

I. Concrete Temperature: ASTM C1064/C1064M, one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.

J. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

3.10 Defective Concrete

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

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

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

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

3.11 Protection

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

END OF SECTION

DIVISION 5 – STRUCTURAL STEEL

SECTION 05120 – STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.01 Section Includes
- A. Structural steel framing members.
- B. Base plates, shear stud connectors and anchor rods.
- C. Grouting under base plates.

1.02 Related Requirements
- A. Section 05 2100 - Steel Joist Framing.
- B. Section 05 3100 - Steel Decking: Support framing for small openings in deck.
- C. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.03 Reference Standards
- A. For all reference standards listed below, comply with the version year in the governing building code adopted by the Authority Having Jurisdiction. For those reference standards that are not directly referenced by the building code, use the latest edition unless noted otherwise.
- B. AISC (MAN) - Steel Construction Manual.
- C. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges.
- D. AISC 360 - Specification for Structural Steel Buildings.
- E. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
- F. ASTM A29/A29M - Standard Specification for Steel Bars, Carbon Alloy, Hot-Wrought, General Requirements.
- G. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- H. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- J. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- K. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- L. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- M. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- N. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- O. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric).

P. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
Q. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
R. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
S. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
T. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film.
U. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
V. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry.
W. ASTM E709 - Standard Guide for Magnetic Particle Testing.
X. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.
Y. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
Z. ASTM F1852 - Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
AA. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
AB. AWS D1.1/D1.1M - Structural Welding Code - Steel.
AC. ICC (IBC)-2015 - International Building Code.
AD. MPI #79 - Primer, Alkyd, Anti-Corrosive for Metal.
AE. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections.
AF. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").
AG. SSPC-SP 3 - Power Tool Cleaning.
AH. SSPC-SP 6 - Commercial Blast Cleaning.

1.04 Submittals

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Shop Drawings:
1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
2. Connections.
3. Indicate cambers and loads.
4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
D. Product Data: For shop primers, include manufacturer's technical information including basic materials analysis and application instructions.
E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
F. Delegated Connection Design Submittal: Provide delegated connection design submittals as required by the General Notes included in the Project Drawings.
G. Erection Sequence: Provide erection sequence submittal as required by the General Notes included in the Project Drawings.

1.05 Quality Assurance

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
B. Fabricator Qualifications:
   1. A steel fabricator specializing in performing the work of this section with minimum 10 years of experience.
C. Erector Qualifications:
   1. An erector specializing in performing the work of this section with minimum 5 years of experience.
D. Delegated Connection Designer Qualifications: Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of steel connections and licensed in the State in which the Project is located.

1.06 Delivery, Storage And Handling

A. Comply with the requirements of the General Conditions and of ASTM A6/A6M, including the following.
B. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
   1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
C. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
   1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
   2. Clean and relubricate bolts and nuts that become dry or rusty before use.

3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F1852 fasteners and for retesting fasteners after lubrication.

PART 2 - PRODUCTS

2.01 Materials

A. Steel Angles, Plates, and Channels: ASTM A36/A36M.
B. Steel W Shapes and Tees: ASTM A992/A992M.
C. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade C.
D. Pipe: ASTM A53/A53M, Grade B, Finish black.
E. Headed Stud Anchors: AWS D1.1 Type B, ASTM A29 Grades 1010 through 1020.
F. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class C.
G. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade C heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
H. Tension Control Bolts: Twist-off type: ASTM F1852.
I. Unheaded Anchor Rods: ASTM F1554, Grade 55 , Supplementary Requirement S1, Weldable, plain, with matching ASTM A563 or ASTM A563M nuts and ASTM F436/F436M Type 1 washers.
J. Deformed Bar Anchors: AWS D1.1/D1.1M Type C, ASTM A1064 Grade 70.
K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
L. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
    1. Minimum Compressive Strength at 48 Hours: 3000 pounds per square inch.
    2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
    3. Height Change, Plastic State; when tested according to ASTM C827/C827M:
        a. Maximum: Plus 4 percent.
        b. Minimum: Plus 1 percent.
M. Shop and Touch-Up Primers: As required below, complying with VOC limitations of authorities having jurisdiction.
    1. Steel Exposed to Exterior Weather or an Uncontrolled Environment: Two-component, high performance, zinc-rich, aromatic urethane, compatible with topcoat and complying with SSPC-Paint 20.

2. Interior Steel: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI #79 and compatible with topcoat.

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

2.02 Fabrication

A. Shop fabricate to greatest extent possible. Fabricate according to AISC 303 and to AISC 360.

B. Fabricate connections for bolt, nut, and washer connectors.

C. Develop required camber for members.

D. Fabricated uncambered beams with rolling camber up.

2.03 Finish

A. Prepare structural component surfaces in accordance with SSPC-SP3 for interior steel or SSPC-SP6 for all steel exposed to exterior weather or an uncontrolled environment.

B. Shop prime structural steel members:

1. Do not prime surfaces that will be galvanized, fireproofed, field welded, in contact with concrete, or [in slip surfaces of slip-critical connections].
2. All steel exposed to exterior weather or an uncontrolled environment shall be blast cleaned and primed with a submitted and approved zinc-rich primer.
3. Interior steel shall be shop primed with the fabricators standard shop primer.

C. Galvanize structural steel members to comply with ASTM A123/A123M.

2.04 Source Quality Control & Quality Assurance

A. Unless the fabricator is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel, an independent testing agency will perform Special Inspections and field quality control and quality assurance tests in the fabricator's shop as required by Chapter 17 of ICC (IBC)-2015 and Chapter N of AISC 360. Refer to the following parts of the structural drawings for additional Special Inspection requirements.

1. Statement of Special Inspection Notes
2. Two tables titled "Required Verification and Inspection of Steel Construction"

PART 3 - EXECUTION

3.01 Examination

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 Erection

A. Erect structural steel in compliance with AISC 303.

B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing. Refer to the "Construction Loads and Stability" section of the General Notes in the Project Drawings for additional information and requirements.

C. Field weld components, deformed bar anchors and shear studs indicated on shop drawings.

D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".

E. Do not field cut or alter structural members without approval of Structural Engineer.

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

G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 Field Quality Control & Quality Assurance

A. An independent testing agency will perform Special Inspections and field quality control and quality assurance tests as required by Chapter 17 of ICC (IBC)-2015 and Chapter N of AISC 360. Refer to the following parts of the structural drawings for additional Special Inspection requirements:

1. Statement of Special Inspection Notes
2. Two tables titled "Required Verification and Inspection of Steel Construction"

END OF SECTION

DIVISION 5 – STRUCTURAL STEEL

SECTION 05310 – STEEL DECKING

PART 1 – GENERAL

1.01 Section Includes
- A. Roof deck.
- B. Supplementary framing for openings up to and including 8 inches.
- C. Bearing plates and angles.

1.02 Related Requirements
- A. Section 05 1200 - Structural Steel Framing: Support framing for openings larger than 8 inches.
- B. Section 05 2100 - Steel Joist Framing: Support framing for openings larger than 8 inches.
- C. Section 05 5000 - Metal Fabrications: Steel angle at deck edges.

1.03 Reference Standards
- A. For all reference standards listed below, comply with the version year in the governing building code adopted by the Authority Having Jurisdiction. For those reference standards that are not directly referenced by the building code, use the latest edition unless noted otherwise.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- F. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.
- G. ICC (IBC)-2015 - International Building Code.
- H. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks.
- I. SDI (QA/QC) - Standard for Quality Control and Quality Assurance for Installation of Steel Deck.
- J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.04 Submittals
- A. See Section 01 3000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- D. Submit manufacturer's installation instructions.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 Quality Assurance

A. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck shall be in accordance with the quality assurance inspection requirements of SDI (QA/QC).

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

1.06 Delivery, Storage, And Handling

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 - PRODUCTS

2.01 Steel Deck

A. Roof Deck: Non-composite type, dovetail steel sheet:

1. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS) Grade 40, with G60 galvanized coating.

2. Structural Properties: As indicated in General Notes.

2.02 Accessory Materials

A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.

B. Welding Materials: AWS D1.1/D1.1M.

C. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.

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

E. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

2.03 Fabricated Deck Accessories

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gauge, 0.0359 inch thick sheet steel; of profile and size as indicated; finished same as deck.

B. Roof Sump Pans: Formed sheet steel, 14 gauge, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

SECTION 05310 – STEEL DECKING

PART 3 - EXECUTION

3.01 Examination

A. Verify existing conditions prior to beginning work.

3.02 Installation

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. On concrete and masonry surfaces provide minimum 4 inch bearing.

C. On steel supports provide minimum 2 inch bearing at discontinuous ends of deck and minimum 3 inch bearing length of continuous roof deck over interior supports.

D. Fasten deck to steel support members as indicated at spacings indicated on the drawings using methods specified.

E. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.

F. Where roof deck changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Attach both sides of cover plate to roof deck below with the same fasteners and spacings as required for deck to supports.

G. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.

H. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

3.03 Field Quality Control

A. An independent testing agency will perform Special Inspections and field quality control tests as required by Chapter 17 of ICC (IBC)-2015 and SDI (QA/QC). Refer to the following parts of the structural drawings for additional Special Inspection requirements:

1. Statement of Special Inspection Notes
2. Table titled "Required Inspection of Cold-Formed Steel Deck"

B. Concurrent with the submittal of special inspection reports to the Owner's Representative, the special inspector shall submit to the Owner's Representative and the Installer a list of nonconforming items.

END OF SECTION

DIVISION 5 – METALS

SECTION 05400 – COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 Related Documents

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

1.02 Summary

A. This Section includes the following:
   1. Exterior and interior non-load-bearing wall framing.
   2. Soffit joist framing.

B. Related Sections include the following:
   1. Division 5 Section "Metal Fabrications" for masonry shelf angles and connections.
   2. Division 9 Section "Gypsum Board Assemblies" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.

1.03 Performance Requirements

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
   1. Design Loads: Design loads shall be calculated components and cladding load per ASCE/SEI 7 edition indicated on the drawings.
   2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
      a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/600 of wall height at areas backing up brick veneer, and 1/240 of wall height at areas backing up other materials.
      b. Soffit Joist Framing: Vertical deflection of 1/240 of the span.
   3. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
      a. Upward and downward movement of 1 inch.

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

SECTION 05400 – COLD-FORMED METAL FRAMING

1.04 Submittals

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

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

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

C. Welding certificates.

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

1.05 Quality Assurance

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

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

C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

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

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

1.06 Delivery, Storage, And Handling

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

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

PART 2 - PRODUCTS

2.01 Manufacturers

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

1. Allied Studco.
2. AllSteel Products, Inc.
3. California Expanded Metal Products Company.
4. Clark Steel Framing.
5. Consolidated Fabricators Corp.; Building Products Division.
6. Craco Metals Manufacturing, LLC.
7. Custom Stud, Inc.
8. Dale/Incor.
9. Design Shapes in Steel.
10. Dietrich Metal Framing; a Worthington Industries Company.
11. Formetal Co. Inc. (The).
12. Innovative Steel Systems.
13. MarinoWare; a division of Ware Industries.
14. Quail Run Building Materials, Inc.
15. SCAFCO Corporation.
16. Southeastern Stud & Components, Inc.
17. Steel Construction Systems.
18. Steeler, Inc.
19. Super Stud Building Products, Inc.
20. United Metal Products, Inc.

2.02 Materials

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: ST33H (ST230H).
2. Coating: G60 (Z180).

B. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: 50 (340), Class 1 or 2.
2. Coating: G90 (Z275).

2.03 Exterior Non-Load-Bearing Wall Framing

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inches (1.09 mm).
2. Flange Width: 1-5/8 inches (41 mm).

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: 0.0538 inches (1.37 mm)
   2. Flange Width: 1-1/2 inches.

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

D. Single Deflection Track Option: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
   1. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
   2. Flange Width: 1 inch (25 mm) plus the design gap for 1-story structures and 1 inch (25 mm) plus twice the design gap for other applications.

E. Double Deflection Track Option: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
   1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:
      a. Minimum Base-Metal Thickness: 0.0538 inch (1.37 mm).
      b. Flange Width: 1 inch (25 mm) plus the design gap for 1-story structures and 1 inch (25 mm) plus twice the design gap for other applications.
   2. Inner Track: Of web depth indicated, and as follows:
      a. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
      b. Flange Width: Equal to sum of outer deflection track flange width plus 1 inch.

2.04 Soffit Joist Framing

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depth indicated, unpunched, with stiffened flanges, and as follows:
   1. Minimum Base-Metal Thickness: As indicated on drawings.
   2. Flange Width: 1-5/8 inches (41 mm) minimum.

2.05 Framing Accessories

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

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
   1. Supplementary framing.
   2. Bracing, bridging, and solid blocking.
   3. Web stiffeners.
   4. Anchor clips.
   5. End clips.
   6. Foundation clips.
   7. Gusset plates.
   8. Stud kickers, knee braces, and girts.
   9. Joist hangers and end closures.
   10. Hole reinforcing plates.
   11. Backer plates.

2.06 Anchors, Clips, And Fasteners

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

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

C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

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

E. Welding Electrodes: Comply with AWS standards.

2.07 Miscellaneous Materials

A. Galvanizing Repair Paint: ASTM A 780.

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

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

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

2.08 Fabrication

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
   a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

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

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening

requirements of sheathing or other finishing materials.

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

PART 3 - EXECUTION

3.01 Examination

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

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

3.02 Installation, General

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.

2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

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

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for

which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

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

H. Install insulation, specified in Division 7 Section "Building Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.03 Exterior Non-Load-Bearing Wall Installation

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to bottom track, unless otherwise indicated. Fast both flanges to top track if required by deflection option selected. Space studs as follows:

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

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

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

1. Single Deflection Track Option: Install single-leg deflection tracks and anchor to building structure.
2. Double Deflection Track Option: Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Deflection Clip Option: Connect vertical deflection clips to infill studs and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.
   1. Top Bridging for Single Deflection Track Option: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
      a. Install solid blocking at maximum 96-inch (2440-mm) centers and as shown on approved Shop Drawings.
   2. Bridging Options:
      a. Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
      b. Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
      c. Proprietary bridging bars installed according to manufacturer's written instructions.

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

3.04 Joist Installation

A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.

B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.
   1. Unless shown otherwise in drawings, install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
   2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on drawings.

C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:
   1. Joist Spacing: As indicated.

D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.
E. Install bridging at intervals indicated. Fasten bridging at each joist intersection as follows:
   1. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
F. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

3.05 Field Quality Control

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

3.06 Repairs And Protection

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

END OF SECTION

DIVISION 5 – STRUCTURAL STEEL

SECTION 05500 – METAL FABRICATIONS

PART 1 – GENERAL

1.01 Section Includes
- A. Shop fabricated steel items.

1.02 Related Requirements
- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 1200 - Structural Steel Framing: Structural steel column anchor bolts.
- D. Section 05 2100 - Steel Joist Framing: Structural joist bearing plates, including anchorage.
- E. Section 05 3100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- F. Section 05 5100 - Metal Stairs.

1.03 Reference Standards
- A. For all reference standards listed below, comply with the version year in the governing building code adopted by the Authority Having Jurisdiction. For those reference standards that are not directly referenced by the building code, use the latest edition unless noted otherwise.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength.
- I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- K. MPI #79 - Primer, Alkyd, Anti-Corrosive for Metal.
- L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

SECTION 05500 – METAL FABRICATIONS

1.04 Submittals

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

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

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

2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.

a. Include the following, as applicable:

1) Design criteria.

2) Engineering analysis depicting stresses and deflections.

3) Member sizes and gauges.

4) Details of connections.

5) Support reactions.

6) Bracing requirements.

PART 2 – PRODUCTS

2.01 Materials - Steel

A. Steel Sections: ASTM A36/A36M.

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

C. Plates: ASTM A283/A283M.

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

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

F. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

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

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

I. Shop and Touch-Up Primer: As required below, complying with VOC limitations of authorities having jurisdiction.

1. Steel Exposed to Exterior Weather or an Uncontrolled Environment: Two-component, high performance, zinc-rich, aromatic urethane, compatible with topcoat and complying with SSPC-Paint 20.

2. Interior Steel: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI #79 and compatible with topcoat.

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

2.02 Fabrication

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

B. Fabricate items with joints tightly fitted and secured.

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

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

2.03 Fabricated Items

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

B. Lintels: As detailed; prime paint finish.

C. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.

D. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.

E. Toilet Partition Suspension Members: Steel channel sections; prime paint finish.

2.04 Finishes - Steel

A. Prime paint steel items.

1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

B. Prepare surfaces to be primed in accordance with SSPC-SP3 for interior steel or SSPC-SP6 for all steel exposed to exterior weather or an uncontrolled environment.

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

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.

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

2.05 Fabrication Tolerances

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

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

C. Maximum Misalignment of Adjacent Members: 1/16 inch.
D. Maximum Bow: 1/8 inch in 48 inches.
E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 – EXECUTION

3.01 Examination
A. Verify that field conditions are acceptable and are ready to receive work.
3.02 Preparation
A. Clean and strip primed steel items to bare metal where site welding is required.
B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.
3.03 Installation
A. Install items plumb and level, accurately fitted, free from distortion or defects.
B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
C. Field weld components as indicated on drawings.
D. Perform field welding in accordance with AWS D1.1/D1.1M.
E. Obtain approval prior to site cutting or making adjustments not scheduled.
F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
3.04 Tolerances
A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.
C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

DIVISION 6 - WOOD & PLASTIC

SECTION 06100 - ROUGH CARPENTRY

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Wood Treatment - Section 06300

1.03 Quality Assurance:
- A. Grades specified shall conform to the most recent grading rules as established by the following bureaus and associations.
  1. PS 20 - American Softwood Lumber Standard.
  2. Western Wood Products Association
  3. Southern Pine Inspection Bureau
- B. Grade and trade mark each piece of lumber or bundle on bundled stock. Use only the recognized official marks of association under whose rules it is graded. Grade and trade marks will not be required if each shipment is accompanied by certificate of inspection issued by grading association.

1.04 Submittals:
- A. Product Data: for each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  1. Include data for wood preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer’s written instructions for handling, storing, installing and finishing treated material.
  2. As requested by authorities having jurisdiction include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply wit requirements. Include physical properties of treated materials both before and after exposure to elevated temperatures when tested according to ASTM D5516 and ASTM D 5664.
  3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

4. Research / evaluation reports – for the following, showing compliance with building code in effect for Project:
   a. Fire-retardant treated wood.
   b. Power-driven fasteners.
   c. Power-actuated fasteners.
   d. Expansion anchors.
   e. Metal framing anchors.

1.05 Delivery, Storage and Handling:

A. Stack lumber, plywood, sheathing, and other materials: provide spacers between each bundle to provide air circulation around bundled material. Provide proper air circulation between stacks and under coverings.

Part 2 - Products

2.01 General:

A. Provide best quality of respective grades and kinds. Lumber and plywood shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship". Factory mark each piece of lumber with grade stamp of grading agency.

B. Maximum moisture content of lumber 19%.

C. Provide dressed lumber (S4S) unless otherwise indicated.

D. Where nominal sizes are indicated, provide actual sized required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

2.02 Grades and Applications of Lumber:

A. Framing lumber for the following shall be "Standard" grade Douglas Fir (WCLIB or WWPA).
   1. Concealed blocking/nailers, cants, grounds, and miscellaneous wood items used in conjunction with the roofing work and as indicated on the Drawings.
   2. Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the Grading Agency indicated.

2.03 Fire-retardant Treated Materials:

A. General – where fire-retardant treated materials are required by authorities having jurisdiction, provide materials that comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant treated wood with appropriate classification

marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

2.04 Panel Products:

A. Miscellaneous Concealed Plywood: shear wall sheathing, span rating to suit framing in each location, and thickness indicated. Refer to Structural Drawings.

B. Telephone and Electrical Equipment Backing Panels: DOC PS 1, C-D Plugged, fire-retardant treated, in thickness indicated, or if not indicated, not less than ½ inch thick.

2.05 Fasteners:

A. All nails, spikes, bolts, connectors and other fasteners used in connections with this work shall be galvanized.

1. Nails, wire, brads and staples – FS-FF-N-105.
2. Power-driven Fasteners – CABO NER-272.
3. Wood screws – ASME B18.6.1.
4. Screws for fastening to cold formed metal framing: ASTM C954 length as recommended by screw manufacturer for material to be fastened.
5. Lag bolts – ASME B18.2.1.
6. Bolts – steel bolts complying with ASTM A 307, Grade A with ASTM C563 hex nuts and, where indicated, flat washers.
7. Expansion anchors – anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   a. Material for interior applications: carbon steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   b. Material for exterior applications: stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, alloy group 1 or 2.

2.06 Metal Framing Anchors:

A. General: provide galvanized steel framing anchors of structural capacity, type, and size indicated and acceptable to authorities having jurisdiction.

B. Galvanized Steel Sheet: hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

Part 3 - Execution

3.01 Sizes and Applications (General Framing):

A. Members shall be accurately cut and fitted, true to line and level, avoiding shims and wedges as much as possible. Discard material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.

B. Where applicable, apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

C. At wood ground, blocking and nailer installation: install where indicated and required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

D. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless noted otherwise.

3.02 Rough Hardware:

A. Provide all sufficient nails, screws, etc. to insure rigidity and structural soundness. Provide hot-dipped galvanized fasteners at all weather exposed locations.

B. Spiking and nailing shall be done using largest size spikes and nails practicable and as indicated on the drawings. Securely attach carpentry according to applicable codes and recognized standards.

C. Bolt nailers and blocking to steel or concrete members with bolts of proportionate strength of members attached, length required, spaced 4'-0" o.c. maximum and 4" from each end, except as otherwise indicated. Countersink fastener heads on exposed carpentry work and fill holes with wood fiber.

D. Predrill members when necessary to avoid splitting of wood.

3.03 Panel Product Installation:

A. Wood structural panels: comply with applicable recommendations contained in APA Form No. E30K, “APA Design/Construction Guide: Residential and Commercial”, for types of structural-use panels and applications indicated. Comply with “Code Plus” provisions in above referenced guide.

End of Section

SECTION 06200 - FINISH CARPENTRY

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.
- B. The erection of wall and partition wood finish materials, installation of door and hardware, and shelving incidentals necessary to finish the carpentry.

1.02 Related Work Specified Elsewhere:
- A. Wood Doors - Section 08200
- B. Hardware and Specialties - Section 08700

1.03 Quality Assurance:
- A. Standards:
  1. Architectural Woodwork Institute:
     a. Architectural Woodwork Quality Standards.
  2. National Electrical Manufacturers Association:
     a. NEMA Publication LD-1.
  3. Western Wood Products Association:
     a. Standard Grading Rules for Western Lumber.
  4. American Plywood Association:

1.05 Product Delivery, Storage and Handling:
- A. All finish materials, trim, etc. shall be inspected to insure that no sub-grade, defective, or machine-marked pieces are installed.

Part 2 - Products

2.01 General:
- A. Grades specified shall conform to the most recent grading rules of the association or bureau under whose rules the lumber is produced.
- B. Quality standards specified shall conform to the latest edition of the Architectural Woodwork Institute's "Quality Standards".
- C. Lumber shall be kiln-dried to 10% to 12% moisture content which shall be maintained during the fabrication of millwork and cabinetry.

Part 3 - Execution

3.01 Miscellaneous Trim and Frames:
- A. Install all trim in longest possible lengths. Stagger joints in adjacent member. Cope at returns and miter at corners. Attach securely in place with fine finishing nails where exposed; set for filling.

B. Immediately prior to final inspection of building, the contractor shall repair or replace all millwork or cabinetry items which have been damaged in any way.

End of Section

SECTION 06300 - WOOD TREATMENT

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  1. American Wood Preservers Association:
     - a. AWPA Standard P-5 (Preservative)
     - b. AWPA Standard Commodity Standards (Treating Process).
  2. Federal Specifications:
     - a. TT-W-550 (Preservative).
     - b. TT-W-571 (Treating Process).
- B. All lumber and plywood receiving wood treatment shall bear the trademark of the process used.
- C. Submit certificate and guarantee of the lumber treated.

Part 2 - Products

2.01 Materials:
- A. Description: Waterborne chemical salts intended for pressure impregnation as a wood preservative. Preservatives with a petroleum vehicle are not permitted.

Part 3 - Execution

3.01 Installation:
- A. Location of treated lumber:
  1. All blocking, plates, nailers and curbs used in conjunction with gravel guards, roof edges and all other wood components used in the roofing project.
- B. Materials shall be pressure treated in accordance with the standards of the American Wood Preservers Institute and the chemical manufacturer's specifications.
- C. Treated material shall conform to AWPB LD-2 and treated to a maximum retention of 0.23 pound of oxide per cubic foot.
- D. Moisture content of finish products shall not exceed 19%.

End of Section

DIVISION 6 - WOOD & PLASTICS

SECTION 06410 - CUSTOM CASEWORK

Part 1 - General

1.01 Section Includes:
- A. Special fabricated cabinet units as indicated on drawings.
- B. Countertops.
- C. Hardware
- D. Preparation for site finishing.
- E. Preparation for installing utilities.
- F. Related Documents: The Contract Documents, as defined in Section 01110-Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.

1.02 Related Sections:
- A. Section 06100-Rough Carpentry: Grounds and support framing.
- B. Section 06200-Finish Carpentry: Related trim not specified in this section.
- C. Section 08700-Door Hardware: Cabinet hardware.
- D. Section 09900- Paints and Coatings: Finishing cabinet exterior and interior.

1.03 References:
- A. ANSI/BHMA A156.9-Cabinet Hardware.
- B. AWI-Quality Standards
- C. FS L-F 508-Plastic Sheet, Laminated, Decorative and non-Decorative.
- D. FS MM-L-736-Lumber, Hardware.
- E. FS MMM-A- 130-Adhesive, Contact.
- F. NEMA LD-3-High Pressure Decorative laminates.
- G. PS 1-Construction and Industrial Plywood.
- H. PS 20-American Softwood Lumber Standard.
- I. PS 51-Hardwood and Decorative Ply.

1.04 Submittals:
- A. Shop Drawings: Indicated materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location, and schedule of finishes.

1.05 Quality Assurance: Perform work in accordance with AWI Custom quality.

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

1.07 Delivery, Storage, and Handling:
- A. Protect units from moisture damage.
- B. Store materials in ventilated, interior locations under

constant, minimum temperatures of 60 degrees F. And maximum relative humidity of 55 percent.

1.08 Field Measurements: Verify that field measurements are as indicated on shop drawings.

1.09 Coordination: coordinate work with plumbing and electrical rough-in.

Part 2 - Products

2.01 Wood Materials:

A. Softwood Lumber:PS20; graded in accordance with AWI Custom; average moisture content of 6 percent; species and grades as follows:

Item	Species	Cut
Cabinet Frame	Douglas Fir	Economy
Internal Construction	Douglas Fir	Economy
Miscellaneous framing	Douglas Fir	Economy
Sub-Tops	Douglas Fir	Economy

B. Hardwood Lumber FS MM-L-736; graded in accordance with AWI Custom; average moisture content of 6 percent; species and grade as follows:

Item	Species	Cut
Exposed Stiles and Rails	Red Oak	Economy
Miscellaneous Trim	Red Oak	Economy

2.02 Sheet Materials:

A. Softwood Plywood: PS 1; graded in accordance with; core material of veneer or lumber, species and cut as follows:

Item	Face	Cut
Drawer Construction	Douglas Fir	Economy
Gables and Backs	Douglas Fir	Custom
Sub-tops	Douglas Fir	Economy
Non-sight exposed shelving	Douglas Fir	Custom
Miscellaneous	Douglas Fir	Custom

B. Hardwood Plywood: PS 51;AM graded in accordance with AWI; core material fo veneer or lumber; type of glue recommended for application; face veneer and cuts as follows:

SECTION 06410 - CUSTOM CASEWORK

Item	Face Species	Cut
Door and Drawer Fronts	Red Oak	Economy
Drawer Construction	Red Oak	Economy
Gable and Backs	Red Oak	Economy

C. Wood Particles-PS 1;AM standard, composed of wood= chips, medium density, made with high waterproof resin binders; of grade to suit application; sanded faces, located as follows:

Item
Drawer Construction

D. Hardboard: Pressed wood fiber with resin binder, tempered grade, 1/4 inch thick, smooth one side, located as follows:

Item
Drawer Bottoms

2.03 Laminated Materials: Plastic Laminated: NEW LD-T;00550 inch General Purpose Grade; suede surface finish, color and pattern as selected by Architect. All sight exposed surfaces fo cabinets to be laminate finished.

2.04 Accessories:

A. Adhesive: FS MMM-A-130 contact adhesive, water base type, recommended by laminate manufacturer to suit application.
B. Fasteners: Size and type to suit application.
C. Bolts, Nuts, Washers, Lags, Pins and Screws: Of size and type to suit application; galvanized finish in concealed locations and cadmium plated finish in exposed locations.
D. Concealed Joint Fasteners: Threaded steel.
E. Lumber for Shimming, Blocking, and Miscellaneous Applications: Softwood lumber of Douglas Fir species.
F. Primer. Alkyd primer sealer type.
G. Wood filler: Solvent base, tinted to match surface finish color.
H. Plastic Grommets: provide at openings in countertop as indicated on the Drawings. Color to be “black”.

2.05 Architectural Cabinet Tops (Countertops):

A. Quality Standard: Comply with AWI Section 400 and its Division 400C.
B. Type of Top: High pressure decorative laminate complying with the following:
   1. Grade: Custom
   2. Laminate Cladding for Horizontal Surface: High pressure decorative laminate as follows:

a. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1.) Provide selections made by Architect from manufacturer=s full range of standard colors and finishes in the following categories:
   2.) Grade: GP-50 (0.050-inch nominal thickness).
   3.) Grain Direction: Parallel to longest dimension.
   4.) Edge Treatment: Lumber edge for transparent finish matching wood species and cut on cabinet surfaces.

2.06 Factory Finishing of Interior Architectural Woodwork:

A. Quality Standard: Comply with AWI Section 1500 unless otherwise indicated.

B. The finish of custom casework is included under this Section, regardless of whether factory applied or applied after installation.

C. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces and similar preparations for finishing of custom casework, as applicable to each unit of work.

D. Factory Finishing: The extent to which the final finish is applied to architectural woodwork a factory is Contractor=s option, except factor apply at least prime/base coat to the greatest extent possible before delivery.

E. Transparent finish for Open-Grain Woods: Comply with requirements indicated below for grade Finish system, staining, effect, and sheen, with sheen measured on 60 degree gloss meter per ASTM D 523.
   1. Grade: Custom
   2. AWI Finish System No. 5: Catalyzed polyurethane.
   3. Staining: Match Architect=s sample.
   4. Effect: Closed grain (filled finish).
   5. Sheen: Medium-gross ribbed effect 35-45 deg.

F. Transparent Finish for Closed-grain Woods: Comply with requirements indicated below for grade, finish system staining, effect, and sheen.
   1. Grade: Custom
   2. AWI Finish System No. 5: Catalyzed polyurethane.
   3. Staining: Match Architect=s sample.
   4. Effect: Closed grain.
   5. Sheen: Medium-gloss rubbed effect 35-45 deg.

2.07 Fabrication:

A. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

B. Fit shelves, doors and exposed edges with 3/8 inch matching hardwood edging. Use full length pieces only.

C. Cap exposed plastic laminate finish edges with material of same finish and pattern.

D. Door and Drawer Fronts: 3/4 inch thick; overlay style.

E. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

F. 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 cut-outs.

G. Mechanically fasten back splash to countertops with sleet brackets at 16 inches on center.

H. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes; and fixtures and fitting. Verify locations of cutouts from on-site dimensions. Prime paint contact surfaces of cut edgy.

2.08 Finishing:

A. Sand work smooth and set exposed nails and screw.

B. Apply wood filler in exposed nail (and screw) indentations.

C. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.

D. Seal, stain and varnish exposed to view surfaces. Brush apply only.

E. Seal and varnish internal exposed to view and sem-concealed surfaces. Brush apply only.

F. Seat internal surfaces of cabinets with one coat of shellac. Brush apply only.

G. Seal surfaces in contact with cementitious materials.

2.09 Hardware:

A. Shelf Standard and Supports: KV-256 and KV-255. Note: line bored holes every 1.5” with metal shelf pins are acceptable for shelf supports in lieu of shelf standards and clips.

B. Drawer and Door Pulls: Chrome, U-shaped wire pulls.

C. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed.

D. Catches: Magnetic, Stanley SF-45 and SP-46. Provide other types required for special conditions.

E. Drawer Slides: Knape and Vogt: KV1284 typical withKV1485 full

extension ball bearing tracks.

F. Hinges: Blum Model 170-concealed hinges with 170 degree opening or Grass System 1200 (176 degree opening) self-closing with 1000-80 base plate. Two hinges per door up to 36" and 3 hinges per door up to 48" and 4 per door up to 60" high.

G. Coat Hooks: Provide HangSafe Hooks 6400 Series - flat-profile, hook secured with stainless steel #14 x 2" screws and finishing washers. Provide mounting holes at 16" on center minimum and expansion anchor to walls as recommended by manufacturer. Hooks shall be secured to 1.5" thick x 3.5" tall red oak back board x length required.
   1. Quantity: as indicated on the Drawings.
   2. Wood Finish: as indicated in the Color Schedule on the Drawings.

H. Grommets: Provide plastic grommets at all penetrations through countertop for cabling, power cords, etc. as indicated on the Drawings.

Part 3 - Execution

3.01 Examination: Verify adequacy of backing and support framing.

3.02 Installation:

A. Install woodwork to comply with AWI Section 1700 for same grade specified above for type of casework involved.

B. Set and secure casework in place; rigid, plumb, and level.

C. Use fixture attachments in concealed locations for waif mounted components.

D. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.

E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

F. Secure cabinet and counter bases to floor using appropriate angles and anchorages.

G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

H. Install without distortion so that doors and drawers fit openings properly and are accurately aligned.

I. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the finishing work specified in this section to whatever extent not completed at shop or before installation of woodwork.

J. Complete the finishing work specified in this section to

whatever extent not completed at shop or before installation of woodwork,

3.03 Adjusting:

A. Adjust moving or operating parts to function smoothly and correctly.

3.04 Cleaning:

A. Clean work under provisions of 01700-Contract Closeout.

B. Clean casework, counters, shelves, hardware, fittings and fixtures.

3.05 Schedules:

A. Furnish and install all items listed in this schedule at location indicated on the Drawings, complete as to function intended.

B. Casework indicated on the Drawings; custom grade construction.

1. Counter Tops.
2. Base Cabinets.
3. Overhead Cabinets.
4. Wall Cabinets.
5. Shelving-adjustable and fixed.
6. Other items such as shims and fillers as indicated on the Drawings or as required for a complete cabinetwork installation.

END OF SECTION

SECTION 06420 - CUSTOM LAMINATE CASEWORK (CONTRACTOR OPTION)

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Fixed modular laminate clad casework and components.
B. Flexible rail mounted laminate clad casework and components.
C. Solid Surface countertops and backsplash.

1.02 RELATED SECTIONS

A. Blocking within walls where indicated: Section 06100 Rough Carpentry.
B. Millwork, trim, etc.: Section 06200 Finish Carpentry.
C. Hardware: Section 06410 Custom Casework.
D. Glass: not applicable.
E. Base molding: Division 9.
F. Appliances: Division 11 and drawings.
G. Sinks and service fixtures, service waste lines, connections, and vents: Division 15.
H. Electrical service fixtures: Division 16.

1.03 DEFINITIONS

A. Identification of casework components and related products by surface visibility.
    1. Open Interiors: Any open storage unit without solid door or drawer fronts, units with full glass insert doors and/or acrylic doors, and units with sliding solid doors.
    2. Closed Interiors: Any closed storage unit behind solid door or drawer fronts.
    3. Exposed Ends: Any storage unit exterior side surface that is visible after installation.
    4. Other Exposed Surfaces: Faces of doors and drawers when closed, and tops of cabinets less than 72 inches above furnished floor.
    5. Semi-Exposed Surfaces: Interior surfaces which are exposed to view when doors or drawers are opened, bottoms of wall cabinets and tops of cabinets 72 inches or more above finished floor.
    6. Concealed Surfaces: Any surface not visible after installation.

1.04 QUALITY ASSURANCE

A. Manufacturer: Minimum of 5 years experience in providing manufactured casework systems for similar types of projects, produce evidence of financial

stability (if requested), bonding capacity, and adequate facilities and personnel required to perform on this project.

B. Manufacturer: Provide products certified as meeting or exceeding ANSI-A 161.1-2000 testing standards.

C. Single Source Manufacturer: Casework, countertops and architectural millwork products must all be engineered and built by a single source manufacturer in order to ensure consistency and quality for these related products. Splitting casework, countertops and/or architectural millwork between multiple manufacturers will not be permitted.

D. Quality Standard: Unless otherwise indicated, comply with AWI's Architectural Woodwork Quality Standards for grades of interior architectural woodwork, construction, finishes and other requirements.

1.05 SUBMITTALS

A. Comply with Special Conditions, unless otherwise indicated.

B. Product Data: Manufacturer's catalog with specifications and construction details.

C. Shop Drawings: Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

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.
3. Provide one set of shop drawings which includes all products within this section, engineered and built by a single source manufacturer, with seamless coordination amongst all products.

D. Casework Samples (To be available upon request):

1. Base cabinet: Cabinet conforming to specifications, with drawer and door.
2. Wall cabinet: Cabinet conforming to specifications, with door.
3. Cabinet samples shall be complete with specified hardware for doors, drawers and shelves.
4. Component samples: Two sets of samples for each of the following:

a. Decorative laminate color charts / PVC and ABS edgings.

1.06 PRODUCT HANDLING

A. Deliver completed laminate clad casework, countertops, and related products only after wet operations in building are completed, store in ventilated place, protected from the weather, with relative humidity range of 25 percent to 55 percent.

B. Protect finished surfaces from soiling and damage during handling and installation with a protective covering.

1.07 JOB CONDITIONS

A. Environmental Requirements: Do not install casework until permanent HVAC systems are operating and temperature and humidity have been stabilized for at least 1 week.

1. Manufacturer/Supplier shall advise Contractor of temperature and humidity requirements for architectural casework installation areas.
2. After installation, control temperature and humidity to maintain relative humidity between 25 percent and 55 percent.

B. Conditions: Do not install casework until interior concrete work, masonry, plastering and other wet operations are complete.

1.08 WARRANTY

A. All materials and workmanship covered by this section will carry a five (5) year warranty from date of acceptance.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Manufacturer – Basis for Design:

1. TMI Systems Corporation.
   a. Specifications are based on manufacturer’s literature from TMI SYSTEMS CORPORATION, 50 South Third Avenue West, Dickinson, North Dakota, 58601, Phone: 800-456-6716, fixed modular, flexible rail mounted, and mobile casework and accessories.

b. Other manufacturers shall comply with the minimum levels of material and detailing indicated on the drawings or as specified.

2.02 MATERIALS

A. Core Materials:
   1. Particleboard up to 7/8 inch thick: Industrial Grade average 45-pound density particleboard, ANSI A 208.1-2009, M-2 requirements.
   2. Particleboard 1 inch thick and thicker: Industrial Grade average 45-pound density particle-board, ANSI A 208.1-2009, M-2 requirements.
   3. Medium Density Fiberboard 1/4 inch thick: Minimum average density 45-50 lbs., ANSI A208.2-2009 requirements.
   4. MR Moisture Resistant Particleboard: Average 45-pound density particleboard, ANSI A208.1 1-2009, M-2 requirements.
   5. Toe Base Plywood: 3/4 inch thickness, CC/CD/CDC grades, of western softwood veneers, with NAUF exterior fully water resistant phenolic glues.

B. Decorative Laminates: GREENGUARD Indoor Air Quality Certified
   1. High-pressure decorative laminate VGS (.028), NEMA Test LD 3-2005.
   2. High-pressure decorative laminate HGS (.048), NEMA Test LD 3-2005.
   3. High-pressure decorative laminate HGP (.039), NEMA Test LD 3-2005.
   4. High-pressure cabinet liner CLS (.020), NEMA Test LD 3-2005.
   5. High-pressure backer BKH (.048), (.039), (.028), NEMA Test LD3-2005.
   6. Thermally fused melamine TFM laminate, NEMA Test LD 3-2005. (TFM allowed on casework interiors only, as specified below. Utilization of TFM on any exterior casework surfaces, including door and drawer faces and finished ends, will not be permitted.)

C. Laminate Color Selection: Maximum 1 color per unit face and 5 colors per project. (See Color Selection in section 3.05).

D. Edging Materials:
   1. 1mm PVC banding, machine applied.

2. 3mm PVC banding, machine applied and machine profiled to 1/8 inch radius.

E. Glass:
Not applicable.

2.03 SPECIALTY ITEMS

A. Support Members:
1. Countertop support brackets: Epoxy powder coated, 11 gauge steel with integral cleat mount opening and wire management opening.
2. Undercounter support frames: Epoxy powder coated.
3. Legs: Epoxy powder coated.

2.04 CABINET HARDWARE

F. Refer to Section 06410 Custom Casework for cabinet hardware.

2.05 FABRICATION:

A. Fabricate casework, countertops and related products to dimensions, profiles, and details shown.

B. All casework panel components must go through a supplemental sizing process after cutting, producing a panel precisely finished in size and square to within 0.010 inches, ensuring strict dimensional quality and structural integrity in the final fabricated product.

C. Cabinet Body Construction:
1. Tops and bottoms are glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals, rails and verticals. Minimum 6 dowels each joint for 24 inch deep cabinets and a minimum of 4 dowels each joint for 12 inch deep cabinets. (Mechanical or metal hardware fasteners joining cabinet top and bottom panels to the sides will not be accepted.)
a. Tops, bottoms and sides of all cabinets are particleboard core.
2. Cabinet backs: 1/4 inch thick medium density fiberboard panel fully captured by the cabinet top, bottom and side panels. Finish to match cabinet interior. 3/4 inch x 4 inch particleboard rails will be placed behind the back panel at the top and bottom, and doweled to the sides utilizing 10mm hardwood fluted dowels. A third intermediate rail will be included on all cabinets taller than 56 inches. Utilize hot melt

glue to further secure back and increase overall strength.

a. Exposed back on fixed or movable cabinets: 3/4 inch thick particleboard with the exterior surface finished in VGS laminate as selected.

3. Fixed base and tall units have an individual factory-applied base, constructed of 3/4 inch thick plywood. Base is 102mm (nominal 4 inch) high unless otherwise indicated on the drawings.
4. Base units, except sink base units: Full sub-top glued and doweled to cabinet sides. (Mechanical or metal hardware fasteners joining cabinet sub-top panel to the sides will not be accepted.)
   a. Sink base units are provided with open top and a stretcher at the front, attached to the sides. Back to be split removable access panel.
5. Side panels and vertical dividers shall receive adjustable shelf hardware at 32mm line boring centers. Mount door hinges, drawer slides and pull-out shelves in the line boring for consistent alignment.
6. Exposed and semi exposed edges.
   a. Edging: 1mm PVC machine applied.
7. Adjustable Shelves in Cabinets
   a. Core: Particleboard.
   b. Core Thickness: 3/4 inch up to 30 inches wide, 1 inch over 30 inches wide.
   c. Edge: 1mm PVC on Front Edge Only.
8. Interior finish, units with open Interiors:
   a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with TFM Thermally Fused Melamine laminate.
9. Interior finish, units with closed Interiors:
   a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with TFM Thermally Fused Melamine laminate.
10. Exposed ends:
    a. Faced with high-pressure decorative VGS laminate. Use of TFM on exposed ends will not be permitted.
11. Wall unit bottom:

a. Faced with thermally fused melamine laminate.

12. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.

D. Drawers:
1. Sides, back and sub front: Minimum 1/2 inch thick particleboard, laminated with TFM Thermally Fused Melamine doweled and glued into sides. Top edge banded with 1mm PVC.
2. Drawer bottom: Minimum 1/2 inch thick particleboard laminated with TFM Thermally Fused Melamine, screwed directly to the bottom edges of drawer box.
3. Paper storage drawers: Minimum 3/4 inch thick particleboard sides, back, and sub front laminated with TFM Thermally Fused Melamine. Minimum 1/2 inch thick particleboard drawer bottoms screwed directly to the bottom edges of the drawer box. Provide PVC angle retaining bar at the rear of the drawer.

E. Door/Drawer Fronts:
1. Core: 3/4 inch thick particleboard.
2. High-pressure decorative VGS laminate exterior, balanced with high-pressure cabinet liner CLS. Use of TFM on exterior or interior surfaces of door/drawer fronts will not be permitted.
3. Edges: 3mm PVC, machine applied, external edges and outside corners machine profiled to 1/8 inch radius.
4. Provide double doors in opening in excess of 24 inches wide.

F. Door Fronts with Glass Insert captured by Retainer Clips (CUSTOM GRADE):
1. Core: 3/4 inch thick particleboard.
2. High-pressure decorative VGS laminate exterior, balanced with high-pressure VGS laminate. Use of TFM on exterior or interior surfaces of door fronts will not be permitted.
3. Edges: 3mm PVC, machine applied, external edges and outside corners machine profiled to 1/8 inch radius.

4. Provide cutout in door panel resulting in 3-3/8 inch frame. Exposed cutout edge to be finished with 1mm PVC edgebanding.
5. Notch cutout 3/8 inch x 1/4 inch for glass panel to set into, mounting flush with the back side (interior side) of the door panel. Interior cutout edge to be painted a compatible color to the interior surface.
6. Glass panel to be captured and held in place utilizing glass retainer clips, screwed in place. Minimum eight clips per glass panel located in the four corners of the cutout.

G. Miscellaneous Shelving (not in Cabinets):
1. Core material: 1 inch thick particleboard.
2. High-pressure decorative VGS laminate on both faces.
3. Edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

2.06 ARCHITECTURAL CABINET SOLID SURFACE TOPS (Countertops):

A. Design Load: deflection limited to 1/360.

B. Type of Top: homogeneous solid sheets of filled plastic resin complying with the following:

1. Colors and Patterns: as selected by Architect from manufacturer’s full range.

2. Special Features: eased edge treatment.

3. Accessories:

a. Adhesives: for seams and drop edges, Formica Solid Surfacing Seaming Cartridges, 9 ounce, color to blend with sheet material.

4. Fabrication: assemble work at shop and deliver to job ready for installation. Manufacture in largest practical pieces for handling and shipping without seams.

a. Fabricate work square and to required lines.

b. Recess and conceal fasteners connections and reinforcing.

c. Design, construction, and installation: details to allow for expansion and contraction of materials. Properly install material with hairline joints held rigidly in place.

d. Fabricate countertops and vanities with back splash and side splash pieces to profiles and sizes indicated.

e. Fabricate items to profiles shown with connections and supports as indicated or as required for complete installation in accordance with manufacturer's written instruction sand approved submittals.

f. Provide cut-outs for plumbing fixtures and trim, washroom accessories, appliances, and related items: confirm layout with manufacturer's cut-out templates before beginning work. Round corners of cut-outs and sand edges smooth.

g. Do not exceed manufacturer's recommended unsupported overhang distances.

h. Finish exposed surfaces smooth and polish to low sheen.

i. Radius corners and edges.

j. Tolerances: variations in size or openings shall not exceed +/-1/4".

5. Acceptable manufacturer: Formica Solid Surfacing as manufactured by Formica Group / Fabrications, Cincinnati, Ohio **or approved equal**.

PART 3- EXECUTION

3.01 INSPECTION:

A. The casework contractor must examine the job site and the conditions under which the work under this section is to be performed and notify the building owner in writing of unsatisfactory conditions. Do not proceed with work under this Section until satisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 PREPARATION:

A. Condition casework to average prevailing humidity conditions in installation areas prior to installing.

3.03 INSTALLATION:

A. Erect casework, plumb, level, true and straight with no distortions. Shim as required. Where laminate clad casework abuts other finished work, scribe and cut to accurate fit.

B. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind.

C. Repair minor damage per plastic laminate manufacturer's recommendations.

3.04 CLEANING:

A. Remove and dispose of all packing materials and related construction debris.

B. Clean cabinets inside and out. Wipe off fingerprints, pencil marks, and surface soil etc., in preparation for final cleaning by the building owner.

3.05 COLOR SELECTION:

A. Laminate Color Selection:

1. Select from the full range of standard Wilsonart® and Formica® stock color charts.
2. Thermally fused melamine laminate matched to White color.

B. Hardware Color Selection:

1. Hinge: Select from your choice of epoxy powder coating stock colors matched to White, Beige, Gray, Black and Chrome.
2. Pulls: Select from design specific finish options available in the TMI Vendor Stock Pull Program.
3. Miscellaneous Hardware (support brackets, metal components, etc.): Select from your choice of epoxy powder coating stock colors matched to White, Beige, Gray, Black and Chrome.

C. PVC Edge Banding Color Selection:

1. 3mm PVC: Select from the TMI Vendor Stock PVC Program, including over 200 pattern, woodgrain and solid colors matched to Wilsonart® and Formica® laminates.
2. 1mm PVC: Select from the TMI Vendor Stock PVC Program, including over 200 pattern, woodgrain

and solid colors matched to Wilsonart® and Formica® laminates.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07200 – INSULATION

Part 1 - General

1.01 Work Included:
- A. All materials, labor and services and incidentals necessary for the completion of this section of work.

1.02 Quality Assurance:
- A. Standards:
  - 1. Federal Specifications:
    - a. HH-I-524C, Type IV, Class C, Rigid Insulation.
    - b. ASTM C 665-84, Type 1, Insulation Blankets.
    - c. ASTM D1621, Compressive Strength.
    - d. ASTM E84, Flame Spread and Smoke Developed.
- B. Submittals:
  - 1. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.03 Product Delivery, Storage and Handling:
- A. Rigid insulation board is combustible. During storage and insulation, observe good fire safety practice, including job site housekeeping.

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Rigid Insulation: FS-HH-I-1972/1, Class 2 Rigid Insulation.
  - 1. Type: Glass fiber reinforced polyisocyanurate core with foil facing each side (glass fiber facing at roof insulation), and a compressive strength of 25 p.s.i. and a maximum water vapor transmission rate of >.03 perm-inch.
    - a. Application: 2 layers of rigid insulation. First layer shall be 2” thick / second layer shall be 1.5” thick for a total thickness of 3.5” with a minimum total thermal resistance of R-20, for installation above metal decking and exterior wall at cavities. Refer to Drawings.
  - 2. Type: expanded polystyrene insulation (if applicable).
    - a. Application: 2" thick with a thermal resistance of R-10.4, **for foundation wall perimeter below grade installation only.**
  - 3. Adhesive: as recommended by manufacturer of rigid insulation board.

B. Fibrous Insulation: ASTM C 665-84, Type 1
   1. Type:
      a. 6" thick and 2” thick (approx.) mineral wool or fiberglass fire resistant insulating blanket or batt, with kraft paper facing. Thermal resistance R-19 (6” thick). Refer to Drawings for locations.

C. Vapor Retarder:
   1. Roof Deck Installation:
      a. Two layers of high strength kraft paper laminated with an adhesive and reinforced at edges with fiberglass yarns.
      b. Type Example: Permstop - Owens Corning.

Part 3 - Execution

3.01 Installation - Rigid Insulation:

A. Install rigid insulation horizontally against back-up wall, or to roof deck, as shown on the Drawings.

B. **Rigid insulation and other components applied to metal decking at membrane roofing shall be fastened with approved fasteners at the rate of 1 per 2 square feet to meet FM I-90 requirements.**

C. Install 2 layers of rigid insulation to metal roof deck and at wall cavity. Stagger joints of insulation to provide continuous insulation coverage.

D. Cut insulation by means of a saw, knife, or other sharp tool to fit around obstructions across the wall, such as vents, louvers, pipes and conduit.

E. If mastic adhesive is used to supplement holding the insulation in place, observe label directions.

F. Install 6” thick batt insulation where indicated on the drawings primarily above acoustical ceilings and in walls. Install 2” thick batt insulation in metal stud furr-outs at exterior walls as indicated on the drawings.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07240 - EXTERIOR WALL INSULATION AND FINISH SYSTEM

Part 1 - General

1.01 Work Included:
- A. The General Conditions and applicable sections of Division 1 shall apply to this entire section.
- B. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Flashing and Sheet Metal – Section 07600
- B. Sealants - Section 07900

1.03 Quality Assurance:
1. Standards:
    1. American Society For Testing and Materials:
        a. ASTM C-150, Standard Specification for Portland Cement.
        b. ASTM E-96, Standard Test Methods for Water Vapor Transmission of Materials.
        c. ASTM E-2134, Test Method for Evaluating the Tensile-Adhesion Performance of Exterior Insulation and Finish Systems (EIFS).
        d. ASTM E-2430, Standard Specification for Expanded Polystyrene Thermal Insulation Boards for use in Exterior Insulation and Finish Systems.
        e. ASTM E-2486, Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems.
        f. ASTM E-2568, Standard Specification for PB Exterior Insulation and Finish Systems.
        g. ASTM E96, Water Vapor Transmission, Revyvit is permeable to water vapor.
        h. ASTM G155, Accelerated Weathering, passes 2000 hours.
        i. Mil Std 810B, Mildew Resistance, passes.
2. All other standards as required by the system specified.
3. System Manufacturer shall have a minimum of 10 years of experience in the manufacturing of Exterior Insulation and Finish Systems.
4. System Installer shall have a minimum of 5 years of experience in the installation of Exterior Insulation and Finish Systems. Installer shall have a current required certification from system manufacturer.

1.04 Submittals:
- A. Submit a 2' x 4' sample panel of the finish system indicting color and texture to be used for this project. Panel shall be prepared using same tools and techniques as for the actual project.

B. Submit complete shop drawings, including erection drawings and details, manufacturer's product data describing materials to be used on this project, and test reports if requested by the Architect.

1.05 Product Delivery, Storage, and Handling:

A. Deliver all materials to the job site in manufacturer's unopened containers, with legible manufacturer's identification.

B. Upon delivery, inspect materials for physical damage, freezing, or overheating. Questionable materials shall not be used.

C. Store materials in a cool, dry place protected from sunlight, and the elements.

D. Manufacturer's environmental requirements for installation shall be strictly adhered to – temperatures, humidity, etc.

1.06 Warranty: provide manufacturer's standard limited written warranty.

Part 2 - Products

2.01 General:

A. **Products of Revyvit System as manufactured by Dryvit Systems, Inc. are specified herein to simplify descriptions of design, construction, and materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

2.02 Materials - Finish System On Existing Wall Insulation:

A. First Coat: Shall be compatible with the existing EIFS system and shall have a coverage depending upon type of texture, time of exposure, climate, and elevation exposure conditions. Coverage of first coat can vary from 350-500 s.f. per pail depending on conditions.

B. Second Coat: coverage of second coat shall vary from 400-600 s.f. per pail.

B. Drying Time: drying time is dependent upon the air temperature and relative humidity. Under average drying conditions 70 degrees F / 55% R.H. shall provide an approximate drying time of 4 hours. Protect work from rain for at least 24 hours.

D. Temperature for Application: 45 degrees or higher for a minimum of 24 hours.

F. Finish: Revyvit by Dryvit Systems.

1. Color: **Refer to Drawings. Final color selections to be made by Architect.**

2. Texture: match existing and as selected by the Architect.

G. Water: Clean and potable.

H. Trim and Accessories: As indicated on the Drawings, Dryvit.

2.03 Mixing:

A. Mix factory prepared finish material in strict accordance with

manufacturer's recommendations.

Part 3 - Execution

3.01 Application:

A. Before commencing application, inspect all surfaces to receive wall finish system for any irregularities or defects. Substrate shall be free of foreign materials, such as, oil, dust, dirt, form release agents, efflorescence, paint, wax, water replants, moisture, frost, and any other condition that inhibit adhesion.

B. Wall finish system shall be applied in strict accordance with manufacturer's written instruction. Sealant shall not be applied directly to textured finishes or base coat surfaces.

C. Materials shall be protected by permanent or temporary means from inclement weather and other sources of damage prior to, during, and following application until completely dry.

D. Protect adjoining work and property during coating installation. All excess materials shall be removed from the site.

End of Section

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 07260 – VAPOR BARRIER

PART 1 - GENERAL

1.01 Work Included

A. Furnish all labor, materials, services and equipment required in conjunction with or properly incidental to the installation of under-slab vapor barriers described herein and/or as shown on the drawings.

1.02 Related Work

A. Section 03300: Cast-In-Place Concrete.

1.03 Job Conditions

A. Subbase: Smooth and level, free from damaging protrusions that would puncture vapor barrier.

1.04 References

A. ASTM E 1643 - Standard Practice for Installation of Water Vapor Barriers Used in Contact with Earth or Granular Fill Under Concrete Slabs.

B. ASTM E 1745 - Standard Specification for Plastic Water Vapor Barriers Used in Contact with Soil or Granular Fill under Concrete Slabs: Exceeds Class B

C. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.

D. ASTM E 154 – Standard Test Methods for Water Vapor Barriers Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

E. ASTM D 1709 - Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.

F. ASTM F 1249 – Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor

G. ACI 302.1R – Vapor barrier component (plastic membrane) not less than 10 inches thick.

1.05 Submittals

A. Submit in accordance with Division 1 requirements.

B. Product Data: Provide manufacturers printed product literature and description, including tests and standards that have been performed on the vapor barrier material.

C. Samples: Submit two, 8 1/2 x 11 inch in size, illustrating the vapor barrier and two (2) 8-1/2-in long sample strips of the joint tape.

D. One each of all accessories that will be used in the installation.

E. Verification by Independent testing labs indicating that materials comply with specified requirements.

F. Certificates: Certify that products of this section meet or exceed specified requirements.

G. Manufacturer's Instructions: Indicate complete installation instructions.

PART 2 - PRODUCTS

2.01 Available Products
- A. Stego Wrap 15 mil Vapor Barrier by Stego Industries, L.L.C.
- B. Perminator™ 15 mil by W.R. Meadows .
- C. Vapor Block 15 (mil) by Raven Industries, Inc.
- D. Moistop Ultra 15 (mil) by Fortifiber Building Systems Group
- E. Viper Vaporcheck II 15 mil by Insulation Solutions, Inc.

2.02 Source Quality Control And Testing
- A. Vapor barrier membrane shall have following properties:
  1. Water Vapor Barrier: Meets or exceeds Class A according to ASTM E 1745.
  2. Water Vapor Transmission Rate: 0.012 grains/ft2/hour or lower according to ASTM E 96.
  3. Water Vapor Permeance: 0.01 perms or lower according to ASTM E 154 Sec. 7 or F 1249 (max.).
  4. Tensile Strength: 45.0 lbf/in according to ASTM E 154 Sec. 9. .
  5. Puncture Resistance: 2200 g according to ASTM D 1709, Method B

2.03 Accessories
- A. Tape:
  1. High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 4".
- B. Pipe Boot:
  1. Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.01 Examination
- A. Verify that conditions are acceptable for the placement of the vapor barrier.

3.02 Preparation
- A. Ensure that subsoil is approved by Geotechnical Engineer.
  1. Vapor Barrier shall be installed on top of the aggregate, sand or tamped earth base or carton forms. At carton forms provide a vertical leg down to grade and adhered the vapor barrier to the grade beam at or just below the dirt line. Vapor barrier may be placed either above or beneath any carton form slip sheet.

3.03 Installation

A. Install vapor barrier per manufacturer's instructions, illustrations and ASTM E 1643 Standard Practice for Installation of Water Vapor Barriers Used in Contact with Earth or Granular Fill Under Concrete Slabs.

1. Level and tamp or roll granular base.
2. Place Vapor Barrier with the longest dimension parallel with the direction of the pour.
3. Lap Vapor Barrier over footings and seal to foundation walls. Seal all penetrations.
4. Lap joints 6 inches and seal with the recommended pressure sensitive tape.
5. Seal pipe penetrations with pipe boot made from vapor barrier and tape.
6. Protect vapor barrier from damage during installation of reinforcing steel and utilities.
7. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all four sides with pressure sensitive tape.

3.04 Interface With Other Work

A. Coordinate work of all other trades related to the slab base and utility services.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

SECTION 07410 - WALL PANEL SYSTEMS

Part 1 - General

1.01 Work Included:
- A. Single-skin, concealed fastener, prefinished metal wall panels.
- B. Metal trim, accessories, fasteners, and sealants related to the wall panel system.

1.02 Quality Assurance:
- A. Manufacturer shall demonstrate a minimum of ten (10) years of experience in the specified products and applications.
- B. American Architectural Manufacturer=s Association (AAMA):
  1. AAMA 620
  2. AAMA 621
- C. American Society of Civil Engineers (ASCE):
  1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- D. ASTM International (ASTM):
  1. ASTM A653/A653M
  2. ASTM A755/A755M
  3. ASTM B209
  4. ASTM 920
  5. ASTM C1007
  6. ASTM E283

1.03 Panel Performance Requirements:
- A. Structural designs shall have been established from tests per ASTM E72 chamber method. Ultimate loads shall be established without the use of exposed or back-side fastening.
- B. Air Infiltration: maximum 0.06 cfm/s.f. per ASTM E283 at a static-air-pressure difference of 1.57 lbf/s.f., using minimum 10x10 foot test panel that includes side joints.
- C. Water Penetration, Static Pressure: no uncontrolled water penetration per ASTM E331 at a minimum static differential pressure of 6.24 lbf/s.f., using a minimum 10x10 foot test panel that includes side joints.
- D. Structural Performance: provide metal wall panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, per ASTM E72.
  1. Maximum allowable deflection limited to L/180 deflection of panel perimeter normal to plane of wall with no evidence of failure.
- E. Provide metal wall panels and panel accessories from a single manufacturer.

1.04 Submittals:
- A. Product data, including certified independent test data

indicating compliance with requirements.

B. Shop Drawings including full elevations showing openings and penetrations. Include details of each condition of installation and attachment.
   1. Indicate points of supporting structure that must coordinate with metal wall panel assembly installation.
   2. Indicate details of fastening, including clip spacing.

C. Load span tables including evaluation of panel clip and panel side joint interaction.

D. Samples of each component.

E. Installer Project References: minimum of 5 installations not less than 5 years old, with Owner and Architect contact information.

1.05 Warranty:

A. Manufacturer shall warrant for a period of two (2) years that the panels, trim and accessories furnished by the manufacturer will be free from defects in materials and factory workmanship.
   1. Provide Special Panel Finish Warranty: Manufacturer shall agree to repair or replace metal wall panels that evidence deterioration of finish for the period of twenty (20) years from date of substantial completion.

1.06 Delivery, Storage, and Handling:

A. Protect metal wall panel products during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.

1.07 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Panel Design

A. Panel units shall consist of Metallic-Coated Steel Face Sheet: Coil-coated, ASTM A755/A755M.
   1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Class Z275), structural steel quality.
   2. Aluminum-zinc alloy-coated Steel Sheet: ASTM A792/A792M, Class AZ50 Grade 50 (Class ASM150, Grade 275), structural steel quality.
   3. Face Sheet: minimum 20 gage nominal uncoated thickness.

B. Panel edges shall have an interconnecting design with factory applied vapor sealant in the side laps. Structural fasteners and clips shall be concealed.

C. Panel unit shall be Concept Series, CS-620, as manufactured

by Centria.

2.02 Metal Wall Panel Finish:

A. Fluoropolymer Three-Coat System: 0.8 mil primer with 0.8 mil 70 percent PVDF fluoropolymer color coat, and a 0.8 mil 70 percent PVDF fluoropolymer clear coat, AAMA 621. Centria Duraguard PLUS.

2.03 Fabrication

A. Steel trim shall be the same finish and gage as the exterior and/or interior of the panels.

B. Panels and trim bundles shall be protected with water resistant paper and provided with wood collars to permit handling and stacking in the field.

2.04 Secondary Metal Subgirt Framing:

A. Miscellaneous framing components, general: cold-formed metallic-coated steel sheet, ASTM A653/A653M, G90 (Z180).
   1. Hat Channels: 0.053 inch / 16 ga. minimum.
   2. Sill Channels: 0.053 inch / 16 ga. minimum.

2.05 Base Metal and Finish: match metal wall panel base metal and finish.

Part 3 - Execution

3.01 Inspection:

A. Building tolerances on the panel support steel shall not exceed those defined by the panel manufacturer.
   1. 1/4 inch in any 20 foot length vertically or horizontally.
   2. 1/2 inch in any building elevation.

B. Alignment of the panel support system should be checked and defects corrected prior to installing panels.

C. Verify that window, door, and other penetrations match layout on shop drawings.

3.02 Secondary Framing Installation:

A. Install secondary metal framing components to tolerances indicated, as shown on approved shop drawings. Install secondary metal framing and other metal panel supports per ASTM C1007 and metal wall panel manufacturer=s recommendations.

3.03 Installation:

A. Install metal wall panels in accordance with approved shop drawings and manufacturer’s recommendations. Install metal wall panels in orientation, sizes, and locations indicated. Anchor metal wall panels and other components securely in place. Provide for thermal and structural movement.

B. Trim, accessories, and sealants shall be installed in accordance with approved shop drawings to insure a functional and weather tight installation.
   1. Install clips to supports with self-tapping fasteners. Fasteners shall be stainless steel.
   2. Provide weatherproof escutcheons for pipe and conduit

penetrating exterior walls.

3. Dissimilar Materials: where elements of metal wall panel system come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

C. Dry wipe-down of the exterior surface should be done as the panels are installed.

D. Joint Sealers: install joint sealants where indicated on approved shop drawings.

3.04 Cleaning and Protection:

A. Remove protective films. Clean finished surfaces as recommended by metal wall panel manufacturer. Clear weep holes and drainage channels of obstructions, dirt and sealant. Maintain in a clean condition during construction.

B. Replace damaged panels and accessories that cannot be repaired by finish touch-up or minor repair.

3.04 Closeout Submittal:

A. Provide maintenance data.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07415 – PREFINISHED METAL SOFFIT PANELS

Part 1 - General

1.01 Work Included:
- A. The General Conditions and applicable sections of Division 1 shall apply to this entire section.
- B. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Metal Fabrications - Section 05500
- B. Modified Bitumen Membrane Roofing System - Section 07550
- C. Flashing and Sheet metal - Section 07600

1.03 Quality Assurance:
- A. Qualifications of Installer: Competent and skilled sheet metal applicator familiar with this type installation with successful completion of projects of familiar scope. Applicator shall have at least two years of experience in prefinished sheet metal applications.

1.04 Shop Drawings:
- 1.1 Submit complete shop drawings on all prefinished metal applications, showing layouts of seams, joints, details, and installation methods. Show details of weatherproofing at edges, terminations and penetrations in metal work.

1.05 Applicator and Guarantee:
- C. All work shall be done by one contractor with 5 years minimum experience in this type of metal work.
- B. Provide ten (10) years guarantee written on contractor's letterhead for work of this Section.

1.06 Warranty:
- A. Provide a 20-year manufacturer's warranty covering color fade, chalk and film integrity at no charge.

1.07 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only.**

Part 2 - Products

2.01 Acceptable Manufacturers:
- A. Quality of Manufacturers: The products, colors and finishes herein are of AEP-Span products to establish standards of quality and appearance. The products of other manufacturers are acceptable subject to meeting or exceeding the requirements of these specifications, and the approval of the contracting officer.

2.02 Materials -
- A. Prefinished Metal Soffits:
  - 1. Flush Panel, (FP 12-2) 24 gauge steel with embossed finish.

2. Color: match existing or as selected by Architect.
3. Flashings, Closures, and Trim shall be fabricated from same material, gauge, and finish as panels.
4. Finish: Kynar 500.

Part 3 - Execution

3.01 Installation:

A. Fabricate and install prefinished metal facings in accordance with drawings and recognized sheet metal practices using conventional hand or power tools. Keep cut edges sharp, clean, properly dressed and closely aligned. Exercise care during fabrication and erection to avoid damage.

B. Structural framing members and fasteners shall be sized and located as recommended by the panel manufacturer. The applicator shall insure that the correct fastener has been chosen for size and length necessary for loading requirements. Special care shall be exercised installing fasteners so as not to overdrive or misdirect fasteners which could cause damage to panels or trim. Use colored pop rivets on trim items and where exposed fasteners are necessary. Keep exposed fasteners to very minimum.

C. Only minor scratches and abrasions will be allowed to be touched up. Any other damaged material shall be replaced.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07540 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING SYSTEM

Part 1 - General

1.01 Section Includes:
- A. Preparation of Substrate to Receive Roofing Materials
- B. Roof Insulation Application to Prepared Substrate
- C. Roof Membrane Application
- D. Roof Flashing Application
- E. Incorporation of Sheet Metal Flashing Components and Roofing Accessories into the Roof System

1.02 Products Installed But Not Furnished Under This Section:
- A. Sheet Metal Flashing and Trim

1.03 Related Sections:
- A. Rough Carpentry - Section 06100
- B. Insulation – Section 07200
- C. Flashing & Sheet Metal Section 07600

1.04 Reference Standards:

References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.

ASTM	American Society for Testing and Materials Philadelphia, PA
FM	Factory Mutual Engineering and Research Norwood, MA
NRCA	National Roofing Contractors Association Rosemont, IL
OSHA	Occupational Safety and Health Administration Washington, DC
SMACNA	Sheet Metal and Air Conditioning Contractors National Association, Chantilly, VA
UL	Underwriters Laboratories, Northbrook, IL

1.05 Description Of Work:
- A. **Project Type:** new installation over cover board. **Deck:** Metal **Slope:** as indicated on the Drawings.
- B. **Rigid Insulation:**
  1. Top and Bottom Layers: Polyisocyanurate, having a total thickness of **3.5"** – top layer of 1 1/2" and bottom layer of 2”. Refer to Section 07200, Insulation.
  2. Crickets: Polyisocyanurate (tapered) providing a roof slope to roof drains (refer to Drawings.)
- C. **Roof System:** Smooth type, scrim reinforced 115 mil TPO (Thermoplastic Polyolefin) Fleece Backed System applied as described below.
- D. **Flashing System:** Smooth type, scrim reinforced 60 mil

thermoplastic polyolefin membrane as described below.

1.06 Submittals:

A. Submittals Prior to Contract Award:
   1. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system and eligibility to obtain warranty specified in this section.
   2. Letter from the primary roofing manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

B. Submittals Prior to Project Close-out:
   1. Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

C. Product Data: provide product data sheets for each type of product indicated in this section.

D. Shop Drawings: provide manufacturer=s standard details and approved shop drawings for the roof system specified.

E. Samples: provide samples of insulations, fasteners, membrane materials, and accessories for verifications of quality.

1.07 Quality Assurance:

A. Acceptable Products: Primary roofing products, including each type of sheet, all manufactured in the United States, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 10 years. The primary roofing products shall have maintained a consistent composition for a minimum of five years. **The following products and manufacturers are acceptable on this project:**
   1. Firestone Fleece Backed TPO by **Firestone Building Products** – Nashville, TN 37201.

B. Agency Approvals: The proposed roof system shall conform to the following requirements. No other testing agency approvals will be accepted.
   1. Underwriters Laboratories Class A acceptance of the proposed roofing system without additional requirements for gravel or coatings.

C. Acceptable Contractor: Contractor shall have a minimum of 10 years of experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products.
   1. Roofer shall have an office, warehouse with supplies,

and permanent roofing crews within the State of Oklahoma.

2. Roofer shall have had "NDL" approval for 5 years AT THIS OFFICE from manufacturer and shall perform a minimum of ten (10) NO DOLLAR LIMIT manufacturer guarantees per year.
3. **Owner's Roofing Contractor (Universal Roofing and Sheet Metal located in Moore, Oklahoma) shall be utilized on this project. The bid shall be based on the provided drawings, specifications, and agreed-to pricing.**

D. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractors' Association, amended to include the acceptance of a phased roof system installation.

E. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

F. Manufacturer Requirements: Ensure that the primary roofing materials manufacturer provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.

G. The specified roofing assembly must be rated by Factory Mutual Global (FMG) to meet or exceed the factored uplift pressures outlined in FMG Property Loss Prevention Data Sheet I-28, and complies with FMG Property Loss Prevention Data Sheet I-29 for enhancements at the perimeter and corners.

1.08 Product Delivery Storage And Handling:

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the roof overnight shall be stored on pallets. Rolls of roofing must be stored on

ends. Store materials on the roof in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents and adhesives products away from open flames, sparks or excessive heat. Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings are not acceptable.

C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

D. Damaged Material: Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed and replaced at the Contractor's expense.

1.09 Project/Site Conditions:

A. Requirements Prior to Job Start

1. Notification: Give a minimum of 5 days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.
2. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.
3. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

B. Environmental Requirements:

1. Precipitation: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application.
   Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.
2. Temperature Restrictions: Do not apply adhesive when surface and / or ambient temperatures are below 45F degrees. Drums of adhesive must be stored at a minimum of 55F degrees at the time of use.

C. Protection Requirements:

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.
2. The contractor shall exercise caution during adhesive spraying to avoid overspray. Maintain hand-held wind screens on-site for use as necessary.
3. Limited Access: Prevent access by the public to materials, tools and equipment during the course of

the project.

4. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials. Take precautions to prevent drains from becoming clogged during roofing application.
5. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.
6. When loading materials onto the roof, installer must comply with requirements of the Owner's Representative to prevent overloading and possible disturbance to the building structure.
7. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.

1.10 Guarantee/Warranty:

A. Provide manufacturer's system No Dollar Limit Roofing System Guarantee.
   1. Single-source special guarantee includes roofing plies, base flashings, liquid applied flashing, roofing membrane accessories, fasteners, base sheet, walkway products, manufacturer's expansion joints, manufacturer's edge metal products, and other single-source components of roofing system marketed by the manufacturer.
   2. Guarantee Period: 10 years from date of Substantial Completion.

B. Installer's Guarantee: Submit roofing Installer's guarantee, signed by Installer, covering Work of this Section, including all components of roofing system for the following warranty period:
   1. Guarantee Period: Two Years from date of Substantial Completion.

Part 2 - Products:

2.01 Roofing System Assembly/Products:

A. Insulation: refer to Section 07200.

2.02 Description Of Systems:

A. Cover Board: Underlayment or overlayment board with a water/mold-resistant and polymer coated, with glass fiber mesh embedded on both sides and edges, and pre-primed on one side.
   1. Acceptable Material: Firestone ISO-Guard Roof Board as manufactured by Firestone Building Products.
   2. Thickness: 1/2".

B. Roofing Membrane Materials: furnish a smooth type, polyester scrim reinforced fleece backed thermoplastic polyolefin membrane with a nominal 1.15 inch (115 mil) thickness, for use as a single ply roofing membrane. Membrane shall meet or exceed the minimum requirements of ASTM D-6878, UL Listed, FM Approved, Dade County Product Approval, and Florida Building Code Approved.
   1. Color: white membrane shall be Energy Star Listed, CRRC Listed and Title 24 Compliant.
   2. Acceptable Material: Firestone Fleece Backed TPO 115 mil thermoplastic single-ply roofing membrane by Firestone Building Products.

C. Flashing Materials: A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Membrane shall meet or exceed the minimum requirements of ASTM D-6878, UL Listed, FM Approved, Dade County Product Approval, and Florida Building Code Approved.
   1. Color: white.
   2. Acceptable Material: Firestone TPO 60 mil thermoplastic single-ply roofing membrane.

2.03 Roofing Accessories:

A. Roofing Adhesives:
   1. Polymer-based Bonding Adhesive: one part, synthetic polymer based adhesive, two-sided application for use with Firestone TPO membranes.
   2. One part, membrane edge sealing agent required to protect field-cut edges of Firestone TPO membranes. Applied directly from a squeeze bottle, Firestone TPO Edge Sealant by Firestone Building Products.
   3. One part, synthetic polymer-based primer for preparing surfaces to receive butyl based adhesive tapes, Firestone Primer by Firestone Building Products.
   4. Solvent based seam cleaner used to clean exposed or contaminated seam prior to heat welding, Firestone TPO Membrane Cleaner by Firestone Building Products.
   5. Solvent based, synthetic elastomeric sealant. Durable and UV resistant suitable for use where caulk is typically used such as termination bar applications, by Firestone Building Products.
   6. One part butyl based high viscosity sealant, by Firestone Building Products. Provide between flashing membrane and substrate surface behind exposed termination bars, and between roofing membrane and drain flange.
   7. 100% solids epoxy based two-part sealant, Epoxy - Part

A / Polyamide - Part B, 2-Part Pourable Sealant by Firestone Building Products. Provide at irregularly-shaped penetrations.

B. Flashing Accessories:
   1. A smooth type, 0.060 inches (60 mil) thick unreinforced thermoplastic polyolefin based membrane for use as an alternative flashing / reinforcing material for penetrations and corners, TPO Detailing Membrane. Provide where preformed vent boots cannot be used. Color shall be white.
   2. Mechanical Fasteners (fasteners to be determined by pull tests):
      a. #12 Purlin Roofing Fasteners: self drilling fastener with ¾" long pilot point to prevent existing metal roof panel from "jacking" up the threads during drilling operation. Fasteners to have Tru-Kote Epoxy E-Coating. Factory Mutual Approved, SAE C1022, heat treated, #4 drill point, #3 square drive, for use on metal roofing panels.
   3. Extruded aluminum termination bar with angled lip caulk receiver, and lower leg bulb stiffener. Bar shall be pre-punched with slotted holes at 6" o.c. minimum and 0.090 inches thick.
   4. 6 inch wide, smooth type, heat-weldable polyester scrim reinforced thermoplastic polyolefin membrane strip. Provide as cover strip over non-coated metal edges and flanges. TPO Heat-Weld Cover Tape by approved manufacturer.
   5. 24 gauge steel with 0.025 inch thick TPO based film as required for fabrication into metal gravel stop and drip edge profiles, metal base and curb flashings, sealant pans, and scupper sleeves. TPO Coated Metal by approved manufacturer.

C. Wall and Curb Accessories:
   1. 0.060" thick molded TPO membrane outside corners of base and curb flashing, Firestone TPO Universal Corners by Firestone Building Products. Hot-air weld directly to TPO membrane. Size to be 6" diameter. Color to be white.

D. Penetration Accessories:
   1. 0.075" thick molded TPO membrane sized to accommodate most common pipe and conduit penetrations (1"-6" diameter pipes), including square tubes. Hot-air weld directly to TPO membrane, supply with stainless steel clamping rings, Firestone TPO Preformed Vent Boots.
   2. 0.045" or 0.06" thick molded TPO membrane preformed

boots, split to accommodate most common pipe and conduit penetrations, TPO Split Pipe Boots by Firestone Building Products.

3. 0.045" or 0.06" thick molded TPO membrane preformed square boots, split to accommodate most common square penetrations and conduits, TPO Square Tube Wraps by Firestone Building Products.
4. 0.07" thick molded penetration pocket to provide structure and foundation for the application of pourable sealant at required roof penetrations, weldable, TPO Pourable Sealer Pocket by Firestone Building Products.

E. Field of Roof Accessories:
1. Universal style expansion joint covers - fabricate to accommodate all roof to wall and roof to roof applications. Provide 0.06" reinforced TPO membrane, TPO Expansion Joint Covers by Firestone Building Products.
2. 0.055" thick smooth type, unreinforced thermoplastic polyolefin membrane designed for use as a conforming membrane seal over T-joints, T-Joint Patches by Firestone Building Products.
3. 0.156" thick extruded and textured TPO roll 30" wide, heat weld directly to roofing membrane. Provide with herringbone traction surface, Firestone TPO Walkpad Rolls by Firestone Building Products. Color to be grey.

F. Pipe Supports Typical:
1. Roller System: A Aroller-bearing@ pipe support for roof-mounted gas pipes, RTU condensate lines, and electrical conduit up to 4" I.D. or 5"O.D. Pipes rest on a self-lubricating roller system which is made of a stainless steel or glass-filled nylon rod and a sturdy polycarbonate resin roller. Pipe support base shall be manufactured of polycarbonate resin with a roller rod of glass-filled nylon, and stainless steel metal parts.
2. Load Weight: Maximum load weight may not exceed 125 lbs. per pipestand.
3. Spacing: Not to exceed 10 foot centers. Do not exceed 125 lbs. load weight and adjust pipe stand in height to even load.
4. Acceptable Manufacturer: Pillow Block Pipestand Model 4-R, Miro Industries, Inc., 1780 West 2300 South, Salt Lake City, Utah 84119.

G. Pipe Supports at Turns In Large Piping:
1. Pipe Support Hangers: A Aclevis hanger@ pipe support

hanger for roof mounted gas pipes at all large (over 4" I.D.) piping corners, bends, and Atees@/pipe intersections. Pipes rest on a clevis hanger with a support base of stainless steel polycarbonate. All other metal parts are hot-dip galvanized steel.

2. Load Weight: Maximum load weight not to exceed 310 lbs. per pipestand or 155 lbs. on each base.
3. Spacing: Locate Aclevis@ type pipe hangers at all corners, bends, and Atees@/pipe intersections not to exceed 10'-0" o.c. maximum. Do not exceed 310 lbs. load weight (155 lbs. on each base) and make certain each pipestand is adjusted in height to even load at all pipestands.
4. Acceptable Manufacturer: Pillow Block Pipestand Model 6-H, Miro Industries, Inc., 1780 West 2300 South, Salt Lake City, Utah 84119.

Part 3- Execution

3.01 Preparation:

A. General: Sweep or vacuum all surfaces, removing all loose substances prior to commencement of roofing.

3.02 Substrate Preparation:

A. Existing Built-up Roofing System:
   1. After removal and disposal of existing roofing system, Roofer shall inspect substrate and determine surface is acceptable for installation of new roofing system.
   2. Verify surfaces are dry, clean, and smooth.
   3. Verify all roof openings or penetrations through the roof are solidly set, and that all flashings are tapered.

3.03 Recover Board Panel: Mechanically attach the recover board panels, using the specified fasteners, as directed above. Do not install more recover board than will be completely waterproofed each day.

3.04 Flashing:

A. General:
   1. Refer to Section 07600 and below.
   2. All penetrations shall be a minimum of 24" from curbs, walls, and edges to provide adequate space for proper flashing.
   3. Flash all perimeter, curb, and penetration conditions with coated metal, membrane flashing, and flashing accessories as appropriate to the site condition.
   4. All coated metal and membrane flashing corners shall be reinforced with preformed corners or non-reinforced membrane.

5. Hot-air weld all flashing membranes, accessories, and coated metal. A minimum 2" wide (hand welder) weld is required.
6. All cut edges of reinforced membrane must be sealed with Firestone TPO Cut Edge Sealant.
7. Refer to manufacturer's application and specifications manual for additional information and specific construction details.

B. Coated Metal Flashings (where applicable):
1. Coated and metal flashings shall be formed in accordance with approved manufacturer's current construction details and SMACNA guidelines.
2. Coated metal sections used for roof edging, base flashing and coping shall be butted together with a ¼" gap to allow for expansion and contraction. Hot-air weld a 6" wide reinforced membrane flashing strip to both sides of the joint, with approximately 1" on either side of the joint left un-welded to allow for expansion and contraction. 2" wide aluminum tape can be installed over the joint as a bond-breaker, to prevent welding in this area.
3. Coated metal used for sealant pans, scupper inserts, corners of roof edging, base flashing and coping shall be overlapped or provided with separate metal pieces to create a continuous flange condition, and pop-riveted securely. Hot-air weld a 6" wide reinforced membrane flashing strip over all seams that will not be sealed during subsequent flashing installation.
4. Provide a ½" hem for all exposed metal edges to provide corrosion protection and edge reinforcement for improved durability.
5. Provide a ½" hem for all metal flange edges whenever possible to prevent wearing of the roofing and flashing membranes at the flange edge.
6. Coated metal flashings shall be nailed to treated wood nailers or otherwise mechanically attached to the roof deck, wall or curb substrates, in accordance with construction detail requirements.

C. Reinforced Membrane Flashing:
1. The thickness of the flashing membrane shall be the same as the thickness of the roofing membrane.
2. Membrane flashing may either be installed loose or fully adhered to the substrate surface in accordance with "Construction Detail Requirements".
3. Where flashings are to be fully adhered, apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding

adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A great quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dray until tacky to the touch before flashing membrane application.

4. Apply the adhesive only when outside temperature is above 40 degrees Fahrenheit. Recommended minimum application temperature is 50 degrees Fahrenheit to allow for easier adhesive application.
5. The membrane flashing shall be carefully positioned prior to application to avoid wrinkles and buckles.

D. Un-reinforced Membrane Flashings:

1. Un-reinforced membrane is used to field-fabricate penetration or reinforcement flashings in locations where preformed corners and pipe boots cannot be properly installed.
2. Penetration flashings constructed of un-reinforced membrane are typically installed in two sections, a horizontal piece that extends onto the roofing membrane and a vertical piece that extends up the penetration. The two pieces are overlapped and hot-air welded together.
3. The un-reinforced membrane flashing shall be adhered to the penetration surface. Apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.

E. Roof Edges:

1. New wood nailers are to be installed at the entire perimeter edge of the roof to match the depth of the insulation. All eave trim, edge trim and ridge trim metal is to be removed and replaced with new 24 gauge prefinished metal. If coated metal is utilized, owner

will pick a color from the approved manufacturer's standard range of colors.

2. Roof edge flashings are applicable for gravel stop and drip edge conditions as well as for exterior edges of parapet walls.
3. Flash roof edges with metal flanges nailed 4" O.C. to pressure-treated wood nailers. Where required, hot-air weld roof membrane to coated metal flanges.
4. When the fascia width exceeds 4", coated metal roof edging must be attached with a continuous cleat to secure the lower fascia edge. The cleat must be secured to the building no less than 12" O.C.
5. Alternatively, roof edges may be flashed with a 2-piece snap on fascia system, adhering the roof membrane to a metal cant and face nailing the membrane 8" on center prior to installing a snap-on fascia.
6. Flash roof edge scuppers with a coated metal insert that is mechanically attached to the roof edge and integrated as a part of the metal edging.

F. Parapet and Building Walls (where applicable):
1. Flash walls with TPO membrane adhered to the 5/8" thick plywood substrate with bonding adhesive.
2. Secure membrane flashing at the top edge of parapet wall / new wood blocking.
3. Roof membrane must be mechanically attached along the base of walls with screws and plates (deck securement) or screws and inverted termination bar (wall securement) at the following rate: 12" o.c.
4. All coated metal wall flashings and loose applied membrane flashings must be provided with separate metal counterflashings, or metal copings.
5. Metal counterflashings may be optional with fully adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with approved manufacturer's all purpose caulking.

G. Curbs and Ducts:
1. Flash curbs and ducts with TPO membrane adhered to the curb substrate with bonding adhesive, loose applied (Less than 18" in height) or with coated metal flashing nailed 4" on center to pressure-treated wood nailers.
2. Secure membrane flashing at the top edge with a termination bar. Water Block shall be applied between the curb/duct surface and membrane flashing underneath all termination bars. Exposed termination bars shall be mechanically fastened every 8"o.c.; termination

bars that are counter flashed shall be fastened 12” on center.

3. Roof membrane must be mechanically attached along the base of walls with screws and plates (deck securement) or screws and inverted termination bar (wall securement) at the following rate: 12” o.c.
4. All coated metal curb flashings and loose applied membrane flashings must be provided with separate metal counterflashings, or metal copings.
5. Metal counterflashings may be optional with fully adhered flashings depending on guarantee requirements. Exposed termination bars must be sealed with the approved manufacturer’s all purpose caulking.

3.05 Traffic Protection (where applicable):

A. Install walkway pads/rolls at all roof access locations and other designated locations including roof-mounted equipment work locations and areas of repeated rooftop traffic.
B. Walkway pads must be spaced 2" apart to allow for drainage between the pads.
C. Fully adhere walkway pads/rolls to the roof membrane with solvent-based bonding adhesive, applied at the rate of 1 gal. per 100 sq. ft. to both the walkway and roof membrane surfaces. Press walkway in position once adhesive is tacky to the touch.
D. Alternatively, walkway pads/rolls may be hot-air-welded to the roof membrane surface continuously around the perimeter of the pad/roll.

3.08 Daily Seal and Roof Protection:

A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the workday, a daily seal must be performed to temporarily close the membrane to prevent water infiltration. Temporary tie-ins shall be removed prior to commencement of work the following day.
B. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.
C. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.

3.09 Field Quality Control And Inspections:

A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the site on a daily basis.

B. Properly clean the finished roof surface after completion, and verify the drains are not clogged. Clean and restore all damaged surfaces to their original condition.

C. Notification Of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

D. Final Inspection:

1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.

E. Issuance Of The Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07600 - FLASHING AND SHEET METAL

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Modified Bitumen Membrane Roofing System - Section 07550
- B. Sealants - Section 07900

1.03 Quality Assurance:
- A. Standards:
  - 1. American Society of Testing and Materials
    - a. ASTM A-526, Steel Sheet, Zinc-Coated (Galvanized), Commercial Quality.
    - b. ASTM B-32, Solder Metal
  - 2. Federal Specifications:
    - a. SS-C-153B, Cement, Bituminous, Plastics
  - 3. Sheet Metal and Air Conditioning Contractors National Association:
    - a. Architectural Sheet Metal Manual

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Prefinished Sheet Metal overflow scuppers and Prefinished Metal Coping:
  - 1. Galvanized iron, prefinished one side.
  - 2. Gauge: 24 gauge, of design and width as detailed.
  - 3. Acceptable manufacturer: Color Klad - Vincent Brass and Aluminum Co.
  - 4. Finish: Kynar 500 - Refer Color Schedule
- B. Sheet Metal:
  - 1. Galvanized Sheet Steel: ASTM A-526, Commercial Quality.
  - 2. Gauge: 22 Gauge minimum or as required by Drawings or Specifications.
- C. Fasteners: Nails, screws, and other fasteners used in conjunction with this work shall be galvanized or cadmium plated.
- D. Solder: ASTM B-32, alloy grade 58, 50% tin, 50% lead.
- E. Flux: Muriatic acid with zinc.
- F. Sealants: Rubber based compound - refer to Section 07900.
- G. Bituminous Plastic Cement: FS SS-C-153B.

H. Accessories: Provide accessories as recommended by manufacturer or as indicated on Drawings.

Part 3 - Execution

3.01 Fabrication:

A. Shape and install sheet metal as indicated on Drawings. Comply with recommendations of SMACNA "Architectural Sheet Metal Manual."

B. Form exposed faces flat and free of buckles, excessive wave and tool marks. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

C. Hem all exposed edges.

D. Make waterproof corner joints by soldering solidly. Joints shall be full-lapped.

E. Soldering: Shall be done slowly with well heated coppers to thoroughly heat the sheet and completely sweat the solder through the full width of the seam. Ample solder shall be used and the seam shall show a least one full inch of evenly flowed solder. Soldering coppers: Shall be heavy and blunt design, properly tinned before using. Neutralize all excess flux.

F. Provide for thermal expansion of running trim, flashing and other items exposed for more than 15'-0" continuous length. Locate expansion seams at 10'-0" intervals and 2'-0" each side of corners and intersections.

G. Angle bottom edges of exposed vertical surfaces to form drips.

3.02 Installation and Application:

A. General:

1. Furnish those items to be installed by other trades to proper grade for installation.
2. Cooperate with and coordinate installation of sheet metal with roofing work as specified under Membrane Roofing - Section 07550.
3. Install work watertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.
4. Embed all flashing in plastic cement. Coat dissimilar metals from contact with bituminous coating.

B. Metal Coping:

1. Material: 24 gauge, prefinished sheet metal.
2. Fabricate and install in accordance with drawings, and recognized sheet metal practices.
3. Secure coping bedded in plastic cement to blocking.
4. At joints, bed coping in plastic cement and secure on side to backing strip by soldering solid. Do not use screws

or nails in exposed face to coping.

5. Lower edge of coping to be securely hooked to hook strip. Secure to wood blocking with No. 8 x 1" galvanized sheet metal screws at 8 o.c.

End of Section

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07840 - FIRESTOPPING

Part 1 - General

1.01 Related Documents:

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

1.02 Definitions:

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in, or construction joints between, fire rated wall and floor assemblies.

1.03 General Description of the Work:

A. Only tested firestop systems shall be used in specific locations as follows:

1. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
2. Safing slot gaps between edge of floor slabs and curtain walls.
3. Openings between structurally separate sections of wall or floors.
4. Gaps between the top of walls and ceilings or roof assemblies.
5. Expansion joints in walls and floors.
6. Openings and penetrations in fire-rated partitions or walls containing fire doors.
7. Openings around structural members which penetrate floors or walls.

1.04 Related Work Specified Elsewhere:

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03300 - Cast-In-Place Concrete
2. Section 04810 - Masonry
3. Section 07900 - Sealants
4. Section 09250 - Gypsum Wallboard
5. Section ***** - Fire Suppression Piping
6. Section ***** - Common Work Results for Plumbing
7. Section ***** – Common Work Results for HVAC
8. Section ***** - HVAC Insulation
9. Section ***** - Basic Electrical Materials and Methods

1.05 References:

SECTION 07840 - FIRESTOPPING

A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops".
B. Test Requirements: UL 1479, "Fire Tests of Through-Penetration Firestops".
C. Test Requirements: UL 2079, "Tests for Fire Resistance of Building Joint Systems".
D. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.
   1. UL Fire Resistance Directory:
      a. Firestop Devices (XHJI)
      b. Fire Resistance Ratings (BXRH)
      c. Through-Penetration Firestop Systems (XHEZ)
      d. Fill, Voids, or Cavity Material (XHHW)
      e. Forming Materials (XHKU)
      f. Joint Systems (XHBN)
      g. Perimeter Fire Containment Systems (XHDG)
   2. Alternate Systems: "Omega Point Laboratories Directory" (updated annually).
E. Test Requirements: ASTM E 1966, "Standard Test Method for Fire Resistive Joint Systems".
F. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Fire Stops".
H. ASTM E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials".
I. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.
J. All major building codes: ICBO, SBCCI, BOCA, IBC
K. NFPA 101 - Life Safety Code
L. NFPA 70 - National Electric Code

THROUGH-PENETRATION UL CLASSIFICATION SYSTEM

	Fire Stopping Systems	Construction Penetrated	Type Of Construction	UL Classification System Identification
1	No Penetrating Items:	F, W, C	A, B, J, K, L	0001-0999
2	Metallic Pipes, Conduit or Tubing:	F, W, C	A, B, J, K, L	1001-1999
3	Nonmetallic Pipe, Conduit or Tubing:	F, W, C	A, B, J, K, L	2001-2999
4	Electric Cables:	F, W, C	A, B, J, K, L	3001-3999
5	Cable, Trays with Electric Cables:	F, W, C	A, B, J, K, L	4001-4999
6	Insulated Pipes:	F, W, C	A, B, J, K, L	5001-5999
7	Electrical Bussduct Penetrations:	F, W, C	A, B, J, K, L	6001-6999

8	Mechanical Ductwork Penetrations:	F, W, C	A, B, J, K, L	7001-7999
9	Multiple Penetrations Through Common Openings:	F, W, C	A, B, J, K, L	8000-8999

Construction Penetration

F	Floor penetration
W	Wall penetration
C	Either floor or wall penetration

Type of Construction

A-	Concrete floors equal to of less than 5-inches thick
B-	Concrete floors greater than 5-inches thick
J-	Concrete or masonry walls equal to or less than 8-inches thick
K-	Concrete of masonry walls greater than 8-inches thick
L-	Framed walls

JOINT UL CLASSIFICATION SYSTEM

Fire-Resistant Joint Systems		UL Classification System		
		Joint System	Movement Capability	Joint Width
1	Floor-to-Floor	FF	D	0000-0999
2	Wall-to-Wall	WW	D	0000-0999
3	Floor-to-Wall:	FW	D	0000-0999
4	Head of Wall:	HW	D	0000-0999

Movement Capability

D-	Has movement capability

Joint Width

0000-0999	Less than or equal to 2-inches

1.06 Quality Assurance

A. Installer Responsibilities: A firm experienced installing through-penetration firestop systems similar in material, design and extent to that indicated for this Project, whose work has resulted in construction with a record of

successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements.

B. Firestop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single qualified installer.

E. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.

1.07 Submittals:

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified tested firestop systems to be used and manufacturer's installation instructions.

B. Submit Manufacturer's engineering judgment identification number and drawing details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in document.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 Installer Qualifications:

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements.

B. The work is to be installed by a contractor with at least one of the following qualifications:

1. FM 4991 Approved Contractor
2. UL Approved Contractor
3. Hilti Accredited Fire Stop Specialty Contractor

C. Installer shall have not less than 3 years of experience with fire stop installation.

1.09 Delivery, Storage and Handling:

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements,

including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 Project Conditions:

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

1.11 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers, providing they meet or exceed that specified.**

Part 2 – Products

2.01 Firestopping, General:

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.02 Acceptable Manufacturers:

A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN), and perimeter firestop systems (XHDG) listed in Volume 2 of the UL Fire Resistance Directory; provide products of the following manufacturers as identified below:

1. Hilti, Inc., Tulsa, Oklahoma
   800-879-8000 / www.us.hilti.com

2.03 Materials:

A. Use only firestop products that have been UL 1479, ASTM E 814 or UL 2079 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Pre-installed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls, the following products are acceptable:
   1. Hilti CP 680-P Cast-In Place Firestop Device
      a. Add Aerator adaptor when used in conjunction with aerator ("sovent") system.
   2. Hilti CP 681 Tub Box Kit for use with tub installations.
   3. Hilti CP 680-M Cast-In Place Firestop Device for use with noncombustible penetrants.
   4. Hilti CP 653 Speed Sleeve for use with cable penetrations.

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. Hilti CP 604 Self-leveling Firestop Sealant
   3. Hilti CP 620 Fire Foam
   4. Hilti CP 606 Flexible Firestop Sealant
   5. Hilti CP 601s Elastomeric Firestop Sealant

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
   1. Hilti CP 601s Elastomeric Firestop Sealant
   2. Hilti CP 606 Flexible Firestop Sealant
   3. Hilti FS-ONE Intumescent Firestop Sealant

E. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
   1. Hilti CP 672 Speed Spray
   2. Hilti CP 601s Elastomeric Firestop Sealant
   3. Hilti CP 606 Flexible Firestop Sealant
   4. Hilti CP 604 Self-leveling Firestop Sealant

F. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material.
   1. Hilti CP 777 Speed Plugs
   2. Hilti CP 767 Speed Strips

G. Intumescent sealants, caulking materials for use with

combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant

H. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti FS-ONE Intumescent Firestop Sealant
2. Hilti CP 620 Fire Foam
3. Hilti CP 601s Elastomeric Firestop Sealant
4. Hilti CP 606 Flexible Firestop Sealant

I. Non-curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti CP 618 Firestop Putty Stick
2. Hilti CP 658T Firestop Plug

J. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti CP 617 Firestop Putty Pad
2. Hilti Firestop Box Insert

K. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti CP 643N Firestop Collar
2. Hilti CP 644 Firestop Collar
3. Hilti CP 648E/CP648S Wrap Strips

L. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

1. Hilti CP 637 Firestop Mortar
3. Hilti FS 657 FIRE BLOCK
4. Hilti CP 620 Fire Foam
5. Hilti CP 675T Firestop Board

M. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

1. Hilti FS 657 FIRE BLOCK
2. Hilti CP 675T Firestop Board

N. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:

1. Hilti CP 672 Speed Spray
2. Hilti CP 601s Elastomeric Firestop Sealant
3. Hilti CP 606 Flexible Firestop Sealant

4. Hilti CP 604 Self-Leveling Firestop Sealant

O. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:
   1. Hilti FS 657 FIRE BLOCK
   2. Hilti CP 658T Firestop Plug

P. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

Q. Provide a firestop system with an Assembly Rating as determined by UL 2079 which is equal to the time rating of construction joint assembly.

Part 3 - Execution

3.01 Preparation:

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
   1. Verify penetrations are properly sized and in suitable condition for application of materials.
   2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
   3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
   4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
   5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 Coordination:

A. Coordinate location and proper selection of cast-in-place Firestop Devices with trade responsible for the work. Ensure device is installed before placement of concrete.

B. Responsible trades to provide adequate spacing of field run pipes to allow for installation of cast-in-place firestop devices without interferences.

3.03 Installation:

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
   1. Seal all holes or voids made by penetrations to ensure

an air and water resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.04 Field Quality Control:

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
B. Keep areas of work accessible until inspection by applicable code authorities.
C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” or other recognized standard.
D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.05 Identification:

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
   1. The words: "Warning -Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's Name, address, and phone number.
   3. Through-Penetration firestop system designation of applicable testing and inspecting agency.
   4. Date of Installation.
   5. Through-Penetration firestop system manufacturer's name.
   6. Installer's Name.

3.06 Adjusting and Cleaning:

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

End of Section

SECTION 07840 - FIRESTOPPING

DIVISION 7 - THERMAL & MOISTURE PROTECTION

SECTION 07900 - SEALANTS

Part 1 - General

1.01 Work Included:
A. All materials, labor services, and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
A. Standards:
1. TT-S-00230C, Sealing Compound, One Component.
2. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.03 Submittals:
A. Submit manufacturer's specifications and color chart for each type of sealant.
B. Samples: For each kind and color of joint sealant required.
C. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.
D. Product test reports.
E. Preconstruction compatibility and adhesion test reports.
F. Preconstruction field-adhesion test reports.
G. Field-adhesion test reports.

1.04 Warranty:
A. All work done under this section of the work shall be guaranteed for a period of two years from date of final acceptance of the building. Guarantee shall include materials and workmanship required to repair any leaks or the repairs thereof.
B. Special Warranty: Manufacturer’s standard form in which joint sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section for a period of 10 years from date of final acceptance.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
A. Building Sealant: One part high performance polyurethane waterproofing sealant, FS-TT-S-00230C.
1. Acceptable Manufacturer: Sonneborn NP1 Building Sealant.
2. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall

comply with the following limits for VOC content when calculated according to 40 CPR 59, Subpart D (EPA Method 24):

a Architectural Sealants: 250 gIL.

b. Sealant Primers for Nonporous Substrates: 250 gIL.

c. Sealant Primers for Porous Substrates: 775 gIL.

3. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

a. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

4. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

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

B. Silicone Joint Sealants:

1. Mildew-Resistant Neutral-Curing Silicone Joint Sealant: ASTM C 920.

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

1. BASF Building Systems.

2. Dow Corning Corporation.

3. GE Advanced Materials - Silicones.

4. Pecora Corporation.

5. Sika Corporation; Construction Products Division.

6. Tremco Incorporated.

C. Urethane Joint Sealants: Urethane Joint Sealant: ASTM C 920.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work

include, but are not limited to, the following:
a. BASF Building Systems.
b. Bostik, Inc.
c. Lymtal, International, Inc.
d. Pecora Corporation.
e. Sika Corporation; Construction Products Division.
f. Tremco Incorporated.

D. Latex Joint Sealants: Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, GradeNF.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. BASF Building Systems.
b. Bostik, Inc.
c. Pecora Corporation.
d. Tremco Incorporated.

E. Preformed Joint Sealants: Preformed Foam Joint Sealant: Manufacturer's standard preformed, precompressed, open-cell foam sealant manufactured from urethane foam with minimum density of 10 lb/cu. ft. and impregnated with a nondrying, water-repellent agent. Factory produce in precompressed sizes in roll or stick form to fit joint widths indicated; coated on one side with a pressure-sensitive adhesive and covered with protective wrapping.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Dayton Superior Specialty Chemicals.
b. EM SEAL Joint Systems, Ltd.
c. Sandell Manufacturing Co.
d. Schul International, Inc.
e. Willseal USA, LLC.

F. Acoustical Joint Sealants: Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Pecora Corporation.

b. USG Corporation.

G. Joint Sealant Backing: cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type 0 (open-cell material) or any of the preceding types, as approved in writing by joint sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
   1. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

H. Miscellaneous Materials: as recommended by sealant manufacturer.
   1. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
   2. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
   3. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.
   4. Joint Cleaner
   5. Joint Primer/Sealer
   6. Bond Breaker Tape
   7. Joint Backer-Rod: Closed-cell compressible rod stock, size and shape as required by application.

I. Caulking compound: Watertight, gun consistency, conforming to FS-TT-C-598, Type 1.

J. Accessories: As recommended by sealant manufacturer.

K. Color: to be selected from manufacturer’s standard colors.

Part 3 - Execution

3.01 Preparation:

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
   1. Remove laitance and form-release agents from concrete.
   2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant

manufacturer's written instructions. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

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

3.02 Installation: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

A. Do not leave gaps between ends of sealant backings.

B. Do not stretch, twist, puncture, or tear sealant backings.

C. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

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

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealant from surfaces adjacent to joints.
   2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
   3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

G. Acoustical Sealant Installation: Comply with ASTM C 919 and with manufacturer's written recommendations.

H. Clean off excess sealant or sealant smears adjacent to

joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.03 Joint Sealant Schedule:

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non traffic surfaces.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces.

F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal non traffic surfaces.

3.04 Additional Information:

A. Application: All sight exposed caulking, and all exterior applications.

B. Comply with sealant manufacturer's printed instructions.

C. Any surfaces requiring priming, shall be prepared according to manufacturer's recommendations.

D. Install sealants to depths as shown or as recommended by sealant manufacturer. Smooth uneven surfaces.

F. Do not disturb compound by touching, washing, or otherwise until it has cured tack free.

G. Excess compound shall be removed from surfaces after curing.

H. Follow manufacturer's recommendations for painting over sealant.

End of Section

SECTION 08100 - METAL DOORS AND FRAMES

Part 1 - General

1.01 Work Included:
- A. All material labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Hardware and Specialties - Section 08700

1.03 Quality Assurance:
- A. Standards:
  1. American Society for Testing and Materials
     - a. ASTM A-366, Steel Sheets, Carbon, Cold-Rolled, Commercial Quality.
     - b. ASTM A-569, Steel, Carbon, Hot-rolled Sheet and strip, commercial quality.
  2. Underwriters' Laboratories, Inc.
  3. Steel Door Institute (SDI): Recommended specifications for Steel Doors and Frames.
- B. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- C. Source Limitations: Obtain standard steel doors and frames through one source from a single manufacturer.
- D. Fire-Rated Door Frame Assemblies: Assemblies complying with IBC 2009 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire protection ratings indicated.
  1. Test Pressure: Test according to NFPA 252. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill.
  2. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
  3. Smoke-Control Door Assemblies: Comply with NFPA 105.

1.04 Submittals:
- A. Shop Drawings: Product Data: Include construction details, material descriptions, core descriptions, label compliance, and finishes for each type of steel door and frame specified.
  1. Submit shop Drawings showing details for each frame and door type, elevations and details of construction. Provide a schedule of doors and frames referenced to detail and openings as shown on the Drawings.
     - a. Elevations of each door design.
     - b. Details of doors, including vertical and horizontal edge details.
     - c. Frame details for each frame type, including dimensioned profiles.
     - d. Details and locations of reinforcement and

preparations for hardware.
e. Details of each different wall opening condition.
f. Details of anchorages, accessories, joints, and connections.
g. Details of glazing frames and stops showing glazing.
h. Details of conduit and preparations for electrified door hardware and controls.

2. It is the manufacturer's responsibility to obtain templates of finish hardware. The shop Drawings must indicate all hardware applications to the doors and frames.
3. Begin fabrication only after receiving approved shop Drawings.
4. Qualification Data: For Installer.

1.05 Product Delivery, Storage and Handling:

A. All materials shall be protected for shipping so that they may arrive at the job site without undue damage or damage from storage at the job.
B. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
C. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
D. Store doors and frames under cover at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber.
1. If wrappers on doors become wet, remove cartons immediately. Provide minimum 114-inch space between each stacked door to permit air circulation.

1.06 Project Conditions:

A. Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating standard steel frames without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.07 Coordination:

A. Coordinate installation of anchorages for standard steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves,

concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in masonry. Deliver such items to Project site in time for installation.

1.08 Warranty: Provide manufacturer's standard warranty.

Part 2 - Products

2.01 Acceptable Manufacturers:

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

1. CURRIES Company; an ASSA ABLOY Group Company.
2. Steelkraft; and Ingersoll-Rand Company.
3. Or Approved Equal.

2.02 Materials:

A. Cold-Rolled Steel Sheet: ASTM A 100S/A 100SM, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 10111A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.

D. Electrolytic Zinc-Coated Steel Sheet: ASTM A 5911A 59 1M, Commercial Steel (CS), Class B coating; mill phosphatized.

E. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153/A 153M.

G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.

H. Glazing: Comply with requirements in Division S Section "Glazing."

I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for I5-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

J. Grout: In masonry construction use grout for masonry as specified in Division 4. In stud walls use cementitious sprayed fire-resistive material manufactured by the following:

1. Monokote Type MK-6; W.R. Grace Construction Products.
2. Cafco 300; Isolatek International Corp.

2.03 Requirements: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8.

A. Doors – Flush Panel: (SDI Door Type III, Style 2, Seamless):
   1. Door, as indicated on the Drawings shall be constructed of 16 gauge cold-rolled, stretcher leveled sheet steel. Doors shall be insulated with foamed urethane, full length and width of doors. Construct doors with smooth, flush surfaces without visible joints or seams on exposed face or vertical edges. Doors shall be 1-3/4” thick unless noted otherwise.
   2. Close top and bottom edges with a recessed channel end closure or a flush end closure treatment.
   3. Vertical Edges for Single-Acting Doors: Square edge unless beveled edge is indicated.
      a. Beveled Edge: 1/8 inch in 2 inches.
   4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch radius.
   5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
   6. Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

B. Frames:
   1. Hollow metal frames shall be of 16 gauge cold-rolled, pickled steel, except that all frames for single doors over 3'-0" wide, frames for pairs of doors over 4'-0" wide and frames for doors over 9'-0" high shall be of 14 gauge steel. Frames shall be neatly mitered and continuously welded and ground smooth for invisible joints.
   2. Furnish anchors as shown on Drawings or as recommended by manufacturer, to secure frames to adjacent construction, formed of not less than 18 gauge galvanized steel. Install anchors at a maximum of 24' centers of jamb height.
   3. Frames against masonry or concrete are to be slush filled.
   4. Knock-down frames are not permitted.
   5. Frames against masonry or concrete are to be slush filled.
   6. Jamb Anchors:
      a. Masonry Type: Adjustable strap-and-stirrup or T - shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated

straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

b. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.

c. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

d. Ceiling Struts: Minimum 3/8-inch-thick by 2-inch-wide steel.

e. Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick.

7. Sidelight Frames: Provide closed tubular members with no visible face seams or joints; fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

C. Hardware Reinforcement:

1. Reinforcements for locks shall be 3/16" for fronts, with 14 gauge for roses and escutcheons. Hinge reinforcements shall be at least 10 gauge x 1 2" x 9". Provide steel strike and hinge reinforcement cover for frames.

D. Jamb Anchors: Provide number and spacing of anchors as follows:

1. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

a. Two anchors per jamb up to 60 inches in height.

b. Three anchors per jamb from 60 to 90 inches in height.

c. Four anchors per jamb from 90 to 120 inches in height.

d. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 120 inches in height.

2. Stud-Wall Type: Locate anchors not more than 18 inches

from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

a. Three anchors per jamb up to 60 inches in height.
b. Four anchors per jamb from 60 to 90 inches in height.
c. Five anchors per jamb from 90 to 96 inches in height.
d. Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
e. Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.

E. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.
1. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
2. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

F. Stops and Moldings:
1. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, fabricated from same material as door face sheet in which they are installed.
2. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8 inch high, unless otherwise indicated.
3. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

G. Labeled Doors and Frames:
1. Where doors and frames are called for on Drawings as labeled, their construction shall conform to all requirements and bear the appropriate U.L. label.

H. Steel Finishes
1. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
a. Finish standard steel door and frames after assembly.
2. Metallic-Coated Steel Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

3. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP *6/NACE* No.3, "Commercial Blast Cleaning."

4. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.

a. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

Part 3 - Execution

3.01 Fabrication:

A. All doors, and frames shall be cleaned of rust, grease and other impurities, and all welds ground and filled smooth, Metallic filler to conceal defects is not acceptable.

B. Doors and frames shall be mortised, reinforced, drilled, and tapped for all mortise hardware in accordance with Hardware schedule and templates furnished by the hardware supplier, except that drilling and tapping for surface door closers, door closer brackets, surface panic devices and/or other surface applied hardware shall be done in the field. Frames shall be accurate and done in a neat, workmanlike manner.

3.02 Installation:

A. Standard Steel Frames: Install standard steel frames for doors sidelights borrowed lights and other openings, of size and profile indicated. Comply with SDI 105.

1. Bituminous coating and grout: Any material lost, removed or damaged during transportation or installation shall be replaced.

2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary

braces, leaving surfaces smooth and undamaged.

a. At fire-protection-rated openings, install frames according to NFP A 80.
b. Install frames with removable glazing stops located on secure side of opening.
c. Install door silencers in frames before grouting.
d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
e. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.
   a. Floor anchors may be set with powder-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.
4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar as specified in Division 4 Section "Unit Masonry Assemblies."
6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
7. Installation Tolerances: Adjust standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

B. Standard Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Standard Steel Doors:
      a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
      c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
      d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum ¾ inch.
   2. Fire-Rated Doors: Install doors with clearances according to NFP A 80.
   3. Smoke-Control Doors: Install doors according to NFPA 105.

C. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with standard steel door and frame manufacturer's written instructions.

3.03 Adjusting and Cleaning:

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including standard steel doors or frames that are warped, bowed, or otherwise unacceptable.

B. Clean grout and other bonding material off standard steel doors and frames immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

D. Galvannealed Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions. Do not use abrasive, caustic or acid cleaning agents.

E. Protect doors and frames from damage until final acceptance by Contracting Officer. Replace/repair any damaged items as directed above.

End of Section

SECTION 08200 - WOOD DOORS

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Finish Hardware - Section 08700

1.03 Quality Assurance:
- A. Standards:
  1. Architectural Woodwork Institute:
     a. Architectural Woodwork Quality Standards
  2. Underwriter's Laboratories, Inc.
- B. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-Accredited certification body.
- C. Source Limitations: Obtain flush wood doors from single manufacturer.
- D. Quality Standard: In addition to requirements specified, comply with AWI's "Architectural Woodwork Quality Standards Illustrated."
- E. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at according to NFPA 252 and UL 10B.
  1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
  2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
  3. Fire-Rated Doors must be provided with fire labels.

1.04 Submittals:
- A. Shop Drawings:
  1. It is the manufacturer's responsibility to obtain templates of finish hardware. The shop Drawings must indicate all hardware applications to the doors.
  2. Begin fabrication only after receiving approved ship Drawings.
  3. Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
  4. Samples for Initial Selection: Color charts consisting

of actual materials in small sections.

5. Samples for Verification:
   a. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.
6. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.05 Products Delivery, Storage and Handling:

A. When doors are delivered to job site, doors shall receive first coat of finish. Store in a protected area.
B. Comply with requirements of referenced standard and manufacturer's written instructions.
C. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
D. Mark each door on bottom rail with opening number used on Shop Drawings.

1.06 Warranty:

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span, or do not comply with tolerance limitations in referenced quality standard.
   1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
   2. Warranty shall be in effect during the following period of time after date of Final Completion.
      a. Solid Core Interior Doors: Life of installation.

Part 2 - Products

2.01 Doors (non-labeled):

A. Doors shall be 1 3/4" thick interior grade, veneered, with a particleboard core. Construction shall meet AWI 1300 PC, "Custom" standard. Doors shall have I.S. "Premium" grade

faces - Plain Sliced Red Oak. Provide hardwood top, bottom, and side edges.

2.02 Doors (labeled):

A. Doors shall be 1 3/4" thick interior grade, veneered, with a mineral core (refer to Drawings for ratings. Construction shall meet AWI 1300 FD, "Custom" standard. Doors shall have I.S. "Premium grade faces - Plain Sliced Red Oak. Provide hardwood top, bottom, and side edges.

B. Where doors are called for on drawings as labeled their construction shall conform to all U.L. requirements and bear the appropriate U.L. label.

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

1. Algoma Hardwoods, Inc.
2. Ampco, Inc.
3. Buell Door Company Inc.
4. Chappell Door Co.
5. Eagle Plywood & Door Manufacturing, Inc.
6. Eggers Industries.
7. Graham; an Assa Abloy Group company.
8. Haley Brothers, Inc.
9. Ideal Architectural Doors & Plywood.
10. Ipik Door Company.
11. Lambton Doors.
12. Marlite.
13. Marshfield Door Systems, Inc.
14. Mohawk Flush Doors, Inc.; a Masonite company.
15. Oshkosh Architectural Door Company.
16. Poncraft Door Company.
17. Vancouver Door Company.
18. VT Industries Inc.

2.04 Door Construction – General:

A. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, Grade 1L-1, made with binder containing no ureaformaldehyde resin.
2. Blocking - Provide wood blocking in particleboard-core doors as follows:
   a. 5-inch top-rail blocking, in doors indicated to have closers.
   b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
3. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

B. Fire-Protection-Rated Doors: Provide core specified or

mineral core as needed to provide fire protection rating indicated.

1. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
2. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
3. Pairs: Provide formed-steel edges and astragals with intumescent seals.

C. Factory Finishing: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on bottom edges, edges of cutouts, and mortises.
2. Finish doors at factory.
3. Finish doors at factory that are indicated to receive transparent finish. Field finish doors indicated to receive opaque finish.
4 Transparent Finish:
    1. Grade: Premium.
    2. Finish: WDMA TR-6 catalyzed polyurethane.
    3. Staining: Water-based stain with transparent ultraviolet cured catalyzed polyurethane. Color as selected by Architect from manufacturer's full range.
    4. Effect: Open-grain finish.
    5. Sheen: Semigloss.

Part 3 - Execution

3.01 Examination:

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

3.02 Installation:

A. Provide clean properly sized and accurately placed mortises

and drilled holes for all mortise and surface mounted finish hardware, in accordance with Hardware Schedule and templates furnished by the hardware supplier.

B. Comply with the tolerance requirements of AWI for prefitting. Install in accordance with the requirements of the NWMA Door Guarantee.

C. Repair or replace doors damaged during installation. Repair doors which do not swing or operate properly.

D. Hardware: For installation, see Division 08 Section "Door Hardware."

E. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.
   1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

F. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
   1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide l inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
      a. Comply with NFP A 80 for fire-rated doors.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
   3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

G. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

H. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.03 Adjusting:

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

End of Section

DIVISION 8 - DOORS & WINDOWS

SECTION 08310 - TORNADO DOORS

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 System Description:
- A. Design Requirements - Tornado Doors:
  - 1. ICC 500-2014 Tornado Doors.

1.03 Submittals:
- A. Shop Drawings: Indicate details and dimensions of fabrications and installation, including any operators and controllers.
- B. Manufacturer’s Literature: Descriptive literature and installation instructions.

1.04 Quality Assurance:
- A. Qualifications:
  - 1. Manufacturer Qualifications: Minimum five years of experience in producing doors of the type specified.
  - 2. Installer Qualifications: Manufacturer's approval.
  - 3. Doors shall have fire resistance rating as per the drawings.

1.05 Delivery Storage and Handling:
- A. Follow manufacturer's instructions.

1.06 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 General:
- A. Refer to Drawings for location, size, and details.

2.02 Tornado Door:
- A. Locations: provide where indicated on the drawings (Doors #43 and 52).
- B. Acceptable Manufacturer:
  - 1. Manufacturer and model number:
    - a. Steelcraft - Ingersoll Rand Security Technologies / Paladin PW-Series Flush Doors and FP14 Frame.
    - b. Republic Doors and Frames, Inc. / DE Series - FEMA 361 Flush Doors.
    - c. Provide Underwriters Laboratories, Inc. label for the fire rating classification where applicable.

C. Materials:
1. Door Construction:
a. Face Skins: 14 gage A-60 Galvannealed Steel.
b. Hinge and Rail Reinforcement: hinge edge is non-beveled and reinforced with a continuous 10 gage steel channel projection welded at 5" on center maximum.
c. Top and Bottom Channels: inverted steel channel - 14 gage at top and 16 gage at bottom, welded at 2.5" on center maximum.
d. Core: steel stiffened (both doors) with filler as required to obtain applicable strength rating at DoorS #43 and 52.
e. Lock Rail: beveled and reinforced with continuous 14 gage steel channel welded at 5" on center maximum.
f. Closer Reinforcement: 14 gage.
g. Stiffeners: 18 gage, 4" wide spaces at 6" on center maximum and welded at 5" on center maximum vertically.
h. Top and Bottom Channels: 14 gage inverted steel channels with additional 12 gage flush channel.
2. Provide factory applied baked-on rust inhibiting primer in accordance with ANSI A250.10-1998.
3. Refer to Section 08700 Finish Hardware for additional information concerning hardware for these doors and frames.

2.03 Hardware:

A. Provide hardware as per the following:

Hardware Group No. T1 - Doors #43 & 52: Provide each interior tornado door with the following:

Quantity		Description	Model Number	Finish	Mfr
3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	FIRE EXIT HARDWARE	WS9827/9927L 996L-R/V LENGTH AS REQUIRED	626	VON
1	EA	RIM CYLINDER	20-057 ICX	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX	626	SCH
2	EA	CLASSIC CORE	23-030	626	SCH
1	SET	ASTRAGAL	9115A HEIGHT AS REQ	AL	NGP
1	EA	SURFACE CLOSER	4040SE-3038 MTG BRKTS, SPCRS, PLATES, & 72MC AS REQ	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	FLOOR STOP / HOLDOPEN	FS41	628	IVE
1	SET	SEALS	5050B H & J	BLK	NGP

SUPPLIER TO VERIFY HARDWARE SPECIFIED AND REVISE AS NECESSARY TO MEET THE REQUIREMENTS OF FEMA 361.

Part 3 - Execution

3.01 Installation:

A. Verify that openings are prepared with headers level, jambs plumb, floor level, without projections, etc. and are correctly dimensioned to receive doors.

B. Install in compliance with manufacturer's instruction. Hang straight, plumb and level, and adjust for smooth, quiet operation.

1. At tornado doors, comply with FEMA Regulations and follow manufacturer's instructions. **Provide complete assembly to meet FEMA 361 and other applicable codes.**

C. Prior to final acceptance of the project, inspect all work done under this section, and make all necessary adjustments, repairs or replacements of defective work.

End of Section

DIVISION 8 - DOORS AND WINDOWS

SECTION 08400 - ENTRANCES AND STOREFRONTS

PART 1 - General

1.01 Work Included:
- A. All materials, labor, services, and incidentals necessary for the completion of all work as shown on the Drawings and specified herein.
- B. All necessary anchors and accessories required for the complete installation of the Storefront units.
- C. Perimeter Sealant.

1.02 Related Work Specified Elsewhere:
- A. Sealants - Section 07900.
- B. Hardware and Specialties - Section 08700.
- C. Glazing - Section 08800.

1.03 Performance And Testing Requirements:
- A. Provision for Thermal Movements:
  1. Storefront framing systems shall be designed to provide for thermal movement of all component materials resulting from a cycling temperature range of 180 degrees F. without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects. Operating windows and doors shall function normally over this temperature range.
- B. Test Procedures and Performance:
  1. Air Infiltration Test, Fixed Unit:
     a. Test Fixed Unit in accordance with ASTM E 283 at static air pressure difference of 6.24 psf.
     b. Air infiltration shall not exceed .06 cfm per square foot of fixed wall area.
  2. Air Infiltration Test, Doors:
     a. Test Doors in accordance with ASTM E 283 at static air pressure difference of 1.57 psf.
     b. Air infiltration shall not exceed .10 cfm per foot of perimeter crack length for pair of doors.
  3. Water Resistance Test:
     a. Test unit in accordance with ASTM E 331.
     b. There shall be no uncontrollable water leakage at a static test pressure of 12.00 psf.
  4. Uniform Load Deflection Test:
     a. Test in accordance with ASTM E 330.
     b. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with 2009 International Building Code.
     c. Deflection under design load shall not exceed

L/175 of the clear span.

5. Uniform Load Structural Test:
   a. Test in accordance with ASTM 330 at a pressure 1.5 times the design wind pressure in 1.05B.3.b.
   b. At conclusion of the test, there shall be no glass breakage, permanent damage to fasteners, storefront parts, or any other damage which would cause the storefront to be defective.
6. Condensation Resistance Test (CRF):
   a. Test unit in accordance with AAMA 1503.1.
   b. Condensation Resistance Factor (CRF) shall be not less than 70.
7. Thermal Transmittance Test (Conductive U Value):
   a. Test in accordance with AAMA 1503.1.
   b. Conductive thermal transmittance (U Value) shall be not more than .44 BTU/HR/degree F/sf. Unless otherwise specified, units tested for condensation resistance and thermal transmittance shall be glazed with no more than two lites of clear, uncoated, annealed glass. Sealed insulating glass shall be of standard construction.

1.04 Quality Assurance:

A. Provide test reports from AAMA accredited laboratories certifying the performance as specified in 1.05.

B. Test reports shall be accompanied by the storefront manufacturer's letter of certification stating that the tested storefront meets or exceeds the referenced criteria for the appropriate storefront type.

1.05 Submittals:

A. Contractor shall submit shop drawings to the Architect for his approval. Drawings shall show scale elevations and sections. Full size sections shall be shown only when needed for clarity. Drawings shall show construction of all parts of the work, including metal and glass thickness, methods of joining, details of all field connections and anchorage, fastening and sealing methods, metal finishes and all pertinent information. Relationship to other work should be clearly indicated. No work shall be fabricated until shop drawings for that work have been finally approved for fabrication.

B. An NFRC Component Modeling Approach (CMA) generated label certificate shall be provided by the manufacturer. The label certificate shall be project specific and will contain the thermal performance ratings of the framing combined with the specified glass, and the glass spacer

used in the fabrication of the glass, at NFRC standard test size as defined in table 4-3 in NFRC 100-2010.

1.06 Delivery, Storage And Handling:

A. Deliver, handle, store and protect system components in accordance with manufacturer's instructions.

B. After erection, the Contractor shall adequately protect all exposed portions of the grid framing metal work from damage by grinding and polishing machines, plaster, lime, acid, cement, or other harmful compounds.

C. Immediately prior to final acceptance of building, inspect all aluminum framing for weather tightness and make all necessary repairs and adjustment.

1.07 Warranties:

A. Total Storefront System

1. The responsible contractor shall assume full responsibility and warrant for one year the satisfactory performance of the total storefront installation. This includes the framing, glass (including insulated units), glazing, anchorage and setting system, sealing, flashing, etc. as it relates to air, water and structural adequacy as called for in the specifications and approved shop drawings. A manufacturer’s material written warranty shall be provided for a minimum of 3 years from substantial completion for all items listed above except for glass which shall have a written warranty of 10 years.

2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor during the warranty period.

1.08 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

PART 2 - PRODUCTS

2.01 Entrance and Storefront System:

A. EFCO Corporation S-406 Wall Thermal Storefront System, with Series D318 DuraStyle Medium Style aluminum entrance doors.

B. Finish – clear anodized aluminum. Coordinate with Architect.

2.02 Material:

A. Aluminum:

1. Extruded aluminum shall be 6063-T6 alloy and temper.

B. Glass:

1. Glass for Fixed Units shall be according to Glazing Schedule.
   Glass for Entrance Doors shall be 1 inch insulated tempered glass units factory glazed.

C. Thermal Barrier:
   1. The thermal barrier material shall be a poured-in-place, two-part polyurethane system. **A nonstructural thermal barrier is unacceptable.**

D. Dissimilar Metals:
   1. All dissimilar metals must be properly insulated to prevent galvanic action.

E. Fasteners:
   1. All exposed fasteners shall be aluminum or stainless steel.

2.03 Fabrication - Fixed Units:

A. General:
   1. All aluminum frame extrusions shall have a minimum wall thickness of .080 inches.
   2. All exposed work shall be carefully matched to produce continuity of line and design with all joints. System design shall be such that raw edges will not be visible at joints.

B. Frames - for 1" glazing:
   1. Depth of frame shall not be less than 6.5 inches.
   2. Face dimension shall not be less than 2 inches
   3. Covers shall connect to frame back members with internally connected and locked celcon insulator clips.
   4. Frame components shall be screw spline construction. Door frames shall be shear block construction.

C. Glazing
   1. All units shall be “dry” glazed with E. P. D. M. gasket on both exterior and interior.

2.04 Fabrication - Entrance Doors:

A. General:
   1. Major portions of the door sections shall have .188” wall thickness.
   2. Glazing stop sections shall have .050” wall thickness.

B. Entrance Doors:
   1. Door stiles shall be no less than 3-½” wide (not including glass stops).
   2. Door stiles and rails shall have hairline joints at corners. Heavy concealed reinforcement brackets shall be secured with screws and shall be deep penetration and fillet welded.
   3. All doors shall have an adjusting mechanism in the top

rail to provide for minor clearance adjustments.

4. Weather-stripping shall be wool pile and shall be installed and shall be installed in one stile of pairs of doors and in jamb stiles of center pivoted doors.
5. Door stops shall include wool pile weather-stripping.

C. Glazing:
1. All units shall be dry glazed with extruded pressure fitting aluminum glazing stops, and E.P.D.M. gasket.

D. Door Frame:
1. Depth of frame shall not be less than 6”.
2. Face dimension shall not be less than 2”.
3. Shear block construction shall be utilized through out. System design shall be such that raw edges will not be visible at joints.

2.05 Finish:
A. Finish – clear anodized aluminum. Coordinate with Architect.

PART 3 EXECUTION

3.01 Inspection:
A. Job Conditions:
1. All openings shall be prepared to the proper size and shall be plumb, level and in the proper location and alignment as shown on the Drawings.

3.02 Installation:
A. Use only skilled tradesmen with work done in accordance with approved shop drawings and specifications.
B. Storefront system shall be erected plumb and true, in proper alignment and relation to established lines and grades.
C. Entrance doors shall be securely anchored in place to a straight, plumb and level condition, without distortion. Weather-stripping contact and hardware movement shall be checked and final adjustment made for proper operation and performance of units.
D. Furnish and apply sealing materials to provide a weather tight installation at all joints and intersections and at opening perimeters.
E. Sealing materials specified shall be used in strict accordance with the manufacturer>s printed instructions and shall be applied only by mechanics specially trained of experienced in their use. All surfaces must be clean and free of foreign matter before applying sealing materials. Sealing compounds shall be tooled to fill the joint and provide a smooth finished surface.

3.03 Anchorage:

A. Adequately anchor to maintain positions permanently when subjected to normal thermal movement, specified building movement, and specified wind loads.

3.04 Protection and Cleaning:

A. The general contractor shall protect the aluminum materials and finish against damage from construction activities and harmful substances. The contractor shall remove any protective coatings as directed by the Architect and shall clean the aluminum surfaces as recommended for the type of finish applied.

End of Section

DIVISION 9 - FINISHES

SECTION 09120 - CEILING SUSPENSION SYSTEMS

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Gypsum Wallboard - Section 09250
- B. Acoustical Treatment - Section 09500

1.03 Quality Assurance:
- A. Standards:
  1. American Society for Testing and Materials
     - a. ASTM C-635, Metal Suspension Systems for Acoustical Tile and Lay-In-Panel Ceilings.
     - b. ASTM C-636, Recommended Practice of Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In-Panels.
  2. All materials to comply with NFPA 101, 16-3.3.2, where applicable.
- B. Submittals:
  1. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Suspended Acoustical Ceiling - Exposed Grid: ASTM C-635, intermediate structural classification.
  1. Main Beams, Cross Tees and Concealed Members: .015 cold rolled zinc coated steel.
  2. Wall Angle: .020 cold rolled zinc coated steel.
  3. Special Members: Provide special shaped members as shown on the Drawings.
  4. Member Finish: Exposed surfaces shall be flat white low-gloss grid.
  5. Hanger Wire: No. 12 gauge cold drawn, annealed, galvanized.
  6. Accessories: Provide wall clips, hold-down clips (shall be removable without damage to boards; two each panels opposite sides), beam clamps leveling splines, hanger clips, splice plates), (keep to a minimum), for a complete installation.

7. Acceptable Manufacturer: 200 Snap-Grid System, Chicago Metallic Corporation
8. Acoustical "Cloud" Edge Trim:
   a. Axiom Classic Trim as manufactured by Armstrong World Industries, Inc.
   b. Commercial quality extruded aluminum alloy 6063 trim channel with factory applied baked polyester paint finish.
   c. Color - white (to match ceiling grid).
   d. Height - 8".
   e. Provide all necessary accessories including, but limited to, corner posts, T-bar connection clips, galvanized steel splice plates, etc. Do not hang acoustical clouds from edge trim.

B. Suspended Gypsum Board Ceilings:
1. Structural Channels: Cold-rolled, 16 gauge, galvanized steel.
2. Furring Channels: Roll-formed, hat sections, 20 gauge.

Part 3 - Execution

3.01 General:
A. Coordinate with electrical and mechanical contractors in placement of light fixtures, grilles, etc. to conform with ceiling pattern.
B. Construct necessary scaffolding, adequate and safe, in accordance with applicable laws and ordinances. Maintain during this work and remove after completion.
C. Provide thorough and competent foreman and skilled mechanics.

3.02 Installation:
A. Suspended Acoustical Ceiling:
1. Deflection of any component shall not exceed 1/360 of the span.
2. Main tees shall be suspended on 48" centers by 12 gauge wire spaced not more than 48" o.c. along main tee.
3. Cross tees shall be placed at 24" o.c. or as required by the Drawings.
4. Install wall angles at intersection of suspended ceiling and all vertical surfaces. Miter corners where wall molding intersects.
5. Install grid system and ceiling panels with faces in a plane.
6. Provide intersection clips at intersection of all tees.
7. Provide additional hangar wire at four corners of light fixtures.
8. Provide additional hangar wires to insure proper placement

and alignment of grid system.

9. Prior to the final acceptance of the building, examine and adjust water level to be certain that all planes and lines are plumb, square and smooth. Replace all marked, marred or otherwise damaged materials.

B. Suspended Gypsum Board Ceilings:

1. Coordinate location of hangars with other work.
2. Install ceiling framing independent of walls, columns and above ceiling work.
3. Install ceiling framing system in accordance with manufacturer's recommendations.
4. Reinforce openings in ceilings in accordance with manufacturer's recommendations.
5. Laterally brace entire suspension system where required.

3.03 Clean-Up:

A. Completely remove from the job site, at the completion of the work, all cartons, packaging, etc., and all other scraps and waste caused by this trade.

End of Section

DIVISION 9 - FINISHES

SECTION 09250 - GYPSUM WALLBOARD

Part 1 - General

1.01 Work Included:
A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
A. Standards:
1. American Society for Testing and Materials:
a. ASTM C-36, Gypsum Wallboard
b. ASTM C-475, Joint Treatment for Gypsum Wallboard Construction.
B. Federal Specifications:
1. FS-SS-L-30D, Type III, Grade X, Class 1, Gypsum Wallboard.

1.03 Submittals:
A. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.04 Product Delivery, Storage and Handling:
A. All materials shall be delivered to the job site with manufacturer's labels intact and stored in an enclosed shelter providing protection from damage and exposure to the elements.

Part 2 - Products

2.01 Gypsum Wallboard:
A. Type: **Fire-rated**, ASTM C-36.
B. Size: 5/8" thick x 48" wide x 96" or as required.
C. Edges: Tapered.
D. Location: All gypsum board.

2.02 Gypsum Wallboard:
A. Type: **Impact Resistant**, **Fire-rated**, ASTM C-36 / C-1396, Impact Resistance ASTM E-695, Indentation Resistance ASTM D-5420, Abrasion Resistance ASTM D-4977,
B. Size: 5/8" thick x 48" wide x 96" or as required.
C. Edges: Tapered.
D. Location: Where indicated on drawings and / or exposed in corridors.

2.03 Fasteners:
A. Screws: Self-drilling, self-tapping, bugle head, Type S.
B. Nails: Annular ring: GWB-54.

2.04 Joint Treatment Materials:
A. Joint Tape: Perforated Tape, ASTM C-475.
B. Joint Compound: ASTM C-475.

2.05 Accessories:
A. Metal Edge: Similar to United States Gypsum Trim No. 402.
B. Interior Trim: ASTM C 1047.
1. Material: Galvanized coated steel sheet.

2. Shapes:
    a. Cornerbead.
    b. L-Bead: L-shaped; exposed long flange receives joint compound.
    c. Expansion (control) joint.
    d. Curved-Edge Cornerbead: With notched or flexible flanges.

C. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
    1. Minimum Base Metal Thickness: 0.0312 inch.

D. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

Part 3 - Execution

3.01 Installation:

A. Apply gypsum board to horizontal surfaces first, then to vertical.

B. Install gypsum board parallel to studs at vertical surfaces.

C. To minimize joints, use panels of maximum practical lengths.

D. Position all ends and edges of gypsum board over nailing or fastening members. Fit ends and edges closely; do not force together. Stagger end joints.

E. Cut ends, edges, scribe or make cutouts within field of panel in a workmanlike manner.

F. Install trim at all intersections of gypsum board and other surfaces. Provide corner bead at all vertical or horizontal corners.

G. Fasteners:
    1. Drive fasteners in field of panel first, work toward ends and edges.
    2. Perimeter fasteners shall be a least 3/8" from ends and edges.
    3. Attach panels to wood framing members with specified nails spaced out 8" for ceiling, and 8" o.c. at ends and 12" o.c. at each support.
    4. Drive nail head slightly below surface of panel in a uniform dimple without breaking face paper.
    5. Screw fasteners shall be spaced 12" o.c. at each support in the field of the board and 8" o.c. at all edges and ends.
    6. Screws shall be power-driven with an electric screwdriver and screw heads shall provide a slight depression below surface of panel without breaking face paper.

3.02 Joint Treatment:

A. Treat all exposed joints and trim with a three-coat approved system applied in strict accordance with manufacturer's

recommendations.

3.03 Applying Texture Finishes:

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns. Provide light orange peel finish.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.04 Clean-Up:

A. Use all necessary care during execution of the Work of this Section to prevent undue scattering of drywall scraps and dust and to prevent tracking of joint and finishing compounds onto floor surfaces. On completion of each installation segment in a room or space, promptly pick up and remove from the working area all scraps, debris and surplus material.

End of Section

DIVISION 9 - FINISHES

SECTION 09300 - TILE

Part 1 - General

1.01 Work Included:
A. All materials, labor services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
A. Standards:
1. Tile Council of America:
a. Handbook for Ceramic Tile Installation.
2. American National Standards Institute:
a. ANSI A108.6, Ceramic Tile installed with Epoxy Mortar.
b. ANSI A108.4, Ceramic Tile installed water-resistant organic adhesive.
c. ANSI A108.5, Ceramic Tile installed with latex Portland Cement.
d. ANSI A118.4, Latex Portland Cement Mortar.
e. ANSI A118.3, Epoxy Mortar and Grout.
f. ANSI A136.1, Type 1 Organic Adhesive.
g. ANSI A137.1, Ceramic Tile.
h. ANSI A137.3, Porcelain Tiles and Porcelain Tile Panels/Slabs
3. American Society for Testing and Materials:
a. ASTM C-144, Aggregate.
b. ASTM C-150, Portland Cement, Type 1.
c. ASTM C-206, Special Finish Hydrated Lime.
B. All materials shall meet IBC 2009, where applicable.
C. Floor surfaces and elevation changes shall comply with ADAABAAG 302 and 303.
D. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
1. Level Surfaces: Minimum.
2. Step Treads: Minimum.
3. Ramp Surfaces: Minimum.
E. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.
1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
F. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
G. Source Limitations for Other Products: Obtain each of the

following products specified in this Section from a single manufacturer for each product:
1. Stone thresholds.
2. Joint sealants.
3. Cementitious backer units.
4. Metal edge strips.

1.03 Submittals:

A. Submit samples of all tile and grout specified under this section for approval and color selection prior to installation.

B. Submit a "Master Grade Certificate" bearing signatures of both manufacturer and contractor.

C. Submit tile manufacturer's maintenance guides for owner's use in maintaining all tile work specified in this section.

D. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

F. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

G. Samples for Verification:
1. Full-size units of each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 24 inches square, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Stone thresholds in 6-inch lengths.
5. Metal edge strips in 6-inch lengths.

H. Qualification Data: For qualified Installer.

I. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

J. Product Certificates: For each type of product, signed by product manufacturer.
1. Material Test Reports: For each tile-setting and - grouting product and special purpose tile.

1.04 Product Delivery, Storage and Handling:

A. Deliver all materials to job site in manufacturer's unopened containers with grade seal unbroken and labels intact. Keep containers dry. Comply with requirements in

ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

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

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.05 Project Conditions:

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 General:

A. All tile shall be standard grades conforming to ANSI 137.1 unless noted otherwise.

B. Both glazed and unglazed ceramic tile shall be manufactured by the same manufacturer.

C. Refer to Color Schedule for tile color. Colors will a determining factor in tile approval.

D. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI AlOS.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do

not coat unexposed tile surfaces.

G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. American Olean; Division of Dal-Tile International Inc.
   2. Crossville, Inc.
   3. Daltile; Division of Dal-Tile International Inc.

2.02 Ceramic Tile:

A. Wall Tile and Floor Tile:
   1. Type: Unglazed colorbody porcelain.
   2. Nominal Face Size: 12” x 24” – orient as per Drawings.
   3. Edge: All-purpose cushion.
   4. Acceptable Manufacturer: American Olean – Subtle Strands.

B. Trim Shapes and Bases:
   1. Type: Same as floor tile.
   2. Includes bases, caps, stops, returns, trimmers and other shapes to finish installation.
      a. Base for Thin-Set Mortar Installations: Straight, module size 6 by 12 inches.
      b. External Corners for Portland Cement Mortar Installations: provide metal corner trim as manufactured by Schluter Systems LP unless otherwise indicated.
      c. External Corners for Thin-Set Mortar Installations: same as above.
      d. Internal Corners: Field-butted square corners. For base and cap use angle pieces designed to fit with stretcher shapes.

C. Setting Materials:
   1. Epoxy Mortar: ANSI A118.3
   2. Organic Adhesive: ANSI A136.1
   3. Latex Portland Cement Mortar: ANSI A118.4
   4. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Boiardi Products; a QEP company.
      b. Bonsai American; an Oldcastle company.
      c. Bostik, Inc.
      d. C-Cure.
      e. Custom Building Products.
      f. Jamo Inc.
      g. Laticrete International, Inc.
      h. MAPEl Corporation.

i. Southern Grouts & Mortars, Inc.
j. Summitville Tiles, Inc.
k. TEC; a subsidiary of H. B. Fuller Company.

D. Grouting Materials:
1. Floor Tile: Epoxy Grout.
2. Wall Tile: Portland Cement Type.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Boiardi Products; a QEP company.
b. BonsaI American; an Oldcastle company.
c. Bostik, Inc.
d. C-Cure.
e. Custom Building Products.
f. Jamo Inc.
g. Laticrete International, Inc.
h. MAPEl Corporation.
i. Southern Grouts & Mortars, Inc.
j. Summitville Tiles, Inc.
k. TEC; a subsidiary of H. B. Fuller Company.

E. Granite Thresholds:
1. Type: Polished granite.
2. Size: 1 1/4" wide x 1/2" high, double-beveled.
3. Location: Provide marble threshold at centerline of doors at transition between ceramic tile flooring and exposed concrete.

F. Accessories: Provide vitreous china accessories of type and size indicated, suitable for installing by same method as adjoining wall tile.
1. Color and Finish: Match adjoining glazed wall tile.

G. Elastomeric Sealants:
1. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."
a. Use sealants that have a VOC content of 250 gIL or less when calculated according to 40 CPR 59, Subpart D (EPA Method 24).
b. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
2. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
3. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25;

Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, 0; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   1. DAP Inc.; 100 percent Silicone Kitchen and Bath Sealant.
   2. Dow Corning Corporation; Dow Corning 786.
   3. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
   4. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
   5. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
   6. Tremco Incorporated; Tremsil 600 White.

H. Miscellaneous Materials:
   1. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
   2. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic base, designed specifically for required applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.
      a. Equal to products manufactured by Schluter Systems LP.
      b. Provide in minimum lengths of 10’ where possible and practical.
      c. Provide at ALL exposed edges of ceramic wall tile – i.e. top, exterior corners, expansion joints, etc.
   3. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
      a. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM

D 87.

b. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

4. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

5. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints and that does not change color or appearance of grout.

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

1. BonsaI American; an Oldcastle company; Grout Sealer.
2. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
3. C-Cure; Penetrating Sealer 978.
4. Custom Building Products; Grout Sealer.
5. Jamo Inc.; Penetrating Sealer.
6. MAPEl Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout and 004, Keraseal Penetrating Sealer for Unglazed Grout and Tile.
7. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
8. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
9. TEC; a subsidiary of H. B. Fuller Company; TA-256 Penetrating Silicone Grout Sealer.

Part 3 - Execution

3.01 Examination:

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, and free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or

silicone; and comply with flatness tolerances required by ANSI Al08.0 for installations indicated.

2. Verify that concrete substrates for tile floors installed with adhesives or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
   a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
   b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
5. At Porcelain Wall Tile Panels: verify wall substrate has a maximum allowable variation of 1/8” in 10’ from required plane with no more than 1/16” variation in 24’. +

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

3.02 Preparation:

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tilesetting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI AlOS.IA and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.02 Installation:

A. All workmanship and materials shall conform in all respects

to specifications and requirements and in accordance with the standard practice of the Tile Council of America.

B. All ceramic floor tile shall be installed using the following Tile Council of America specifications.
   1. Floor Tile, TCA F131-2K (Concrete).

C. Provide all required trim shapes required to module with field tile, unless otherwise noted on Drawings. All exterior corners shall have metal corner trim as manufactured by Schluter Systems LP.

D. Layout all tile work as to minimize cuts less than one-half tile in size. Align all joints to give straight uniform grout lines, plumb and level or parallel with walls. Strike all joints with a rounded, non-staining tool.
   1. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
   2. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
   3. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Layout tile work and center tile fields in both directions in each space or on each wall area. Layout tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
      a. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
      b. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
   4. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
      a. Wall Tile: 1/16 inch.
   5. Layout tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
   6. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction,

and isolation joints, where indicated or required by tile manufacturer. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

a. Where joints occur in substrates, locate joints in tile surfaces directly above them.
b. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
c. At Porcelain Wall Tile Panels: provide movement joint every 20’ to allow for needed movement of tile layer.

7. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.
   a. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
   b. Do not extend cleavage membrane waterproofing or crack isolation membrane under thresholds set in dry-set portland cement mortar. Fill joints between such thresholds and adjoining tile set on crack isolation membrane with elastomeric sealant.
      1. Metal Edge Strips: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.
8. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

E. Slope entire room or area to floor drains.

3.03 Tile Backing Panel Installation:

A. Install cementitious backer units and treat joints according to ANSI AlOS.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.04 Waterproofing Installation:

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof

membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.05 Cleaning and Protecting:

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

E. Immediately prior to final inspection, replace all damaged tile.

F. Contractor will supply 2% of the total quantity of each tile used. Contractor will supply 3% of the total quantity of each grout used. Place materials in clean marked containers for future use at building.

End of Section

DIVISION 9 - FINISHES

SECTION 09500 - ACOUSTICAL TREATMENT

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services, and incidentals necessary for the completion of this section of the work.

1.02 Related Work Specified Elsewhere:
- A. Ceiling Suspension Systems - Section 09120

1.03 Quality Assurance:
- A. Standards:
  - 1. American Society for Testing and Materials:
    - a. ASTM C-636 Recommended Practice of Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
    - b. ASTM E-84 Surface Burning Characteristics of Building Materials.
  - 2. Federal Specifications:
    - a. SS-S-118B, Sound Controlling Blocks and Boards. Underwriter's Laboratories, Inc.
- B. Submittals:
  - 1. Provide submittals in the form of samples, and documentation, to the Architect for review.

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers**

Part 2 - Products

2.01 Acoustical Ceiling Panels:
- A. 2x2 Tile - Square Edge:
  - 1. Type: FS-SS-S-118B, Class 25
  - 2. Size: 24" x 24" x 5/8". Provide special sizes as indicated on Drawings or as required by others.
  - 3. Finish: Board finish shall be a factory-applied white latex paint, medium textured non-direction fissured surface with a minimum light reflection of 80%.
  - 4. Noncombustibility: Board shall meet class 25-Federal Specification SS-S-118B, ASTM E-84; and, classified by Underwriter's Laboratories for Flame Spread Index 0-25.
  - 5. Type Example and Manufacturer:
    - a. Armstrong Fine Fissured No. 1728, square (2x2)
- B. 2x2 Tile - Tegular Edge:
  - 1. Type: FS-SS-S-118B, Class 25
  - 2. Size: 24" x 24" x 5/8". Provide special sizes as indicated on Drawings or as required by others.

3. Finish: Board finish shall be a factory-applied white latex paint, medium textured non-direction fissured surface with a minimum light reflection of 80%.
4. Noncombustibility: Board shall meet class 25-Federal Specification SS-S-118B, ASTM E-84; and, classified by Underwriter's Laboratories for Flame Spread Index 0-25.
5. Type Example and Manufacturer:
   a. Armstrong Fine Fissured No. 1732, beveled tegular 2x2).

Part 3 - Execution

3.01 Installation:

A. Install in specified grid system per ASTM C-636 and manufacturer's recommendations, as shown on the Drawings.

B. Provide ten (10) pieces of ceiling panels in cartons for future use. Panels shall be in perfect condition.

End of Section

DIVISION 9 - FINISHES

SECTION 09650 – RESILIENT FLOORING

Part 1 - General

1.01 Work Included:
A. All materials, labor, services, and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
A. Installation Qualification: contractors for floor covering installation shall be experienced in managing commercial flooring projects and provide professional installers, qualified to install the various flooring materials specified with a minimum of three years of documented experience. Installer shall be trained by flooring manufacturer and – if applicable – certified to install the specified flooring by the manufacturer.
B. Manufacturer Qualifications: company specializing in manufacturing the specified flooring with minimum three years documented experience.

1.03 Submittals:
A. Submit product data for each type of product indicated.
B. Submit samples for color selection / verification.
C. Maintenance Data and Instructions Furnish manufacturer's recommended maintenance methods and procedures.

1.04 Delivery, Storage, and Handling:
A. Store resilient products and installation materials in dry spaces protected from the weather, at temperatures required by the product manufacturer. Store tiles on flat surfaces.

Part 2 - Products

2.01 General:
A. Refer to color schedule – available tile colors WILL be a factor in product acceptance.

2.02 Materials:
A. Resilient Floor Tile:
1. Type Example: Luxury Vinyl Composition Tile (LVT-1 and LVT-2) as manufactured by Interface LVT.
2. Size: 25cm x 1m.
3. Thickness: 4.5mm.
4. Pattern: Studio Set Vol. 2 Colorline.
5. Location: as shown on the Drawings.
6. Colors: refer to Drawings.
B. Rubber Cove Base: ASTM F 1861, Type TP-Rubber as manufactured by Armstrong Cork Company or approved equal.
1. Size: 4" high x .018 gauge.
2. Provide preformed inside and outside corners.
C. Edging Strips and Tile Reducers: size and length as

required.

D. Primer and Adhesive: As recommended by manufacturer of resilient floor tile for this particular project. All wall base and reducer strips shall be applied with epoxy adhesive.

E. Cleaner or other finishing material: As recommended by flooring manufacturer for the particular type of floor material.

Part 3 - Execution

3.01 Installation:

A. Comply with manufacturer's written instructions for installing specified tile flooring.

B. The Contractor shall be responsible for the manufacturer's representative making mat moisture and PH tests and reporting condition of concrete slab to the Architect in writing prior to placing floor materials.

C. Carefully examine the surfaces on which the above materials are to be applied, report to Architect in writing any unsatisfactory surface and do not begin work until all defective surfaces have been corrected. Otherwise, the Contractor shall assume responsibility for all failures and defects resulting from such defective surfaces.

D. Installation shall not begin until the work of all other trades, including painting, has been completed. The Contractor shall maintain all rooms and sub-floors at a minimum of 70 degrees F. for several days before and after application of tile.

E. The floor shall be thoroughly cleaned and any pockets or cracks shall be filled in accordance with manufacturer's instructions flush with floor surface.

F. The material shall be applied in a first class, workmanlike manner by skilled mechanics experienced in this type of work.

G. Primer and adhesive shall be as recommended by the manufacturer of the flooring for this particular project. The adhesive for applying all materials shall be waterproof and shall be furnished and guaranteed by the flooring manufacturer.

H. Lay tile from center of room or space, working toward perimeter, so that tile at opposite edges of room are of equal width. Adjust as necessary to avoid cut widths of less than 3 inches at room perimeter. Lay tile square to room axis.

I. Fit floor material neatly and tightly into breaks and

recesses, against bases, around pipes and penetrations, under saddles or thresholds, and around permanent cabinets and equipment.

J. Install reducer at each transition from tile to concrete floor.

K. After the flooring has been installed and before the waterproof adhesive has thoroughly set, the surface shall be rolled both ways with rollers made for this purpose, and all excess adhesive on the surface or in the joints shall be removed and the entire surface shall be left perfectly clean.

3.02 Cleaning and Waxing:

A. When, in the opinion of the Contractor, the flooring has sufficiently sealed itself to permit cleaning, the floors shall be thoroughly cleaned with a neutral cleaner as recommended by the manufacturer of the flooring used. After the floors have been cleaned, the Contractor shall protect the floors either with building paper or by keeping traffic off the floors until the building is ready for occupancy.

3.03 Replacement Tile and Base:

A. Provide enough spare floor tile, of each major color, in cartons to cover 50 square feet for future use. Provide 20 linear feet of spare rubber wall base. Resilient floor tile and wall base shall be in perfect condition.

End of Section

DIVISION 9 - FINISHES

SECTION 09670 – RESINOUS FLOORING

Part 1 - General

1.01 Work Included:

A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:

A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

B. The Applicator shall have experience in installation of the flooring system as confirmed by the manufacturer in all phases of surface preparation and application of the product specified.

C. No requests for substitutions shall be considered that would change the generic type of the specified System.

D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.

E. System shall be in compliance with the Indoor Air Quality requirements of California section 01350 as verified by a qualified independent testing laboratory.

F. A pre-installation conference shall be held between Applicator, General Contractor and the Architect for review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.03 Submittals:

A. Provide submittals in the form of samples (3 x 3 inch square), and documentation, to the Architect for review.

1.04 Product Delivery, Storage and Handling:

A. All materials shall be delivered to the job site with manufacturer's labels intact and stored in an enclosed dry storage area providing protection from damage, out of direct sunlight, and exposure to the elements in accordance with the manufacturer’s recommendations and relevant health and safety regulations.

1.05 System Description:

A. The work shall consist of preparation of the substrate, the furnishing and application of a cementitious urethane based self-leveling seamless flooring system with Q-Rok quartz aggregate broadcast and novolac epoxy topcoat.

B. The system shall have the color and texture as specified by the Owner with a nominal thickness of 1/4 inch. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.

C. Cove base (if required) to be applied where noted on plans and

per manufacturers standard details unless otherwise noted.

1.06 Project Conditions:

A. Site Requirements:

1. Application may proceed while air, material and substrate temperatures are between 60 F and 85 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
3. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new concrete to be coated with cementitious urethane material.

1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured for 14 days in accordance with ACI-308 prior to the application of the coating system pending moisture tests. Outside of these parameters manufacturer shall be consulted.
2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
3. Sealers and curing agents should not to be used.
4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements:

1. The Owner shall be responsible for the removal of foodstuffs from the work area.
2. Non-related personnel in the work area shall be kept to a minimum.

1.07 Waste Disposal:

A. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.08 Warranty:

A. Dur-A-Flex, Inc. warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Dur-A-Flex, Inc. published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.

B. Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

SECTION 09670 – RESINOUS FLOORING

Part 2 - Products

2.01 Flooring:

A. Dur-A-Flex, Inc, Poly-Crete MDB (self leveling broadcast quartz), Novolac topcoat seamless flooring system.

1. System Materials:
   a. Topping: Dur-A-Flex, Inc, Poly-Crete MD resin, hardener and MD aggregate.
   b. The aggregate shall be Dur-A-Flex, Inc. Q-Rok quartz aggregate.
   d. Topcoat: Dur-A-Flex, Inc. Dur-A-Glaze Novolac resin and hardener.
2. Patch Materials:
   a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Poly-Crete MD (up to ¼ inch).
   b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Dur-A-Tex UM

2.02 Manufacturer:

A. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802

B. Manufacturer of Approved System shall be single source and made in the USA.

2.03 Product Requirements:

A. Topping Poly-Crete MD

1. Percent Reactive	100 %
2. VOC	0 g/L
3. Bond Strength to Concrete ASTM D 4541	>400 psi, substrates fails
4. Compressive Strength, ASTM C 579	9,000 psi
5. Tensile Strength, ASTM D 638	2,175 psi
6. Impact Resistance @ 125 mils, MIL D-3134, No visible damage or deterioration	>160 inch lbs

B. Topcoat — Dur-A-Glaze Novolac

1. Percent Solids	100 %
2. VOC	8 g/L
3. Flexural Strength, ASTM C 580	5,500 psi
4. Tensile Strength, ASTM D 638	2,500 psi
5. Flexural Modulus, ASTM D 790	1.95 x 10^{6} psi
6. Coefficient of thermal expansion	ASTM D 696 2.2 x 10^{-5} in/in/F
7. Water Absorption ASTM D 570	0.05 %, 24 hrs in water
8. Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles loss	0.075 mg weight
9. Flammability, ASTM D 636	Self-Extinguishing

10.	Potlife @ 70 F	30 minutes
11.	Tack Free Time @ 70 F (ready for re-coat)	8-10 hours
12.	Cure Time for Traffic @ 70 F	24 hours
13.	Heat Resistance Limitation	250 F

Part 3 - Execution

3.01 Examination:

A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.

1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.02 Preparation:

A. General:

1. New and existing concrete surfaces shall be free of oil, grease,curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
2. Moisture Testing: Perform tests recommended by manufacturer and as follows.

. a. Perform anhydrous calcium chloride test ASTM F 1869-98. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 20 lbs/1,000 sf/24 hrs.

b. Perform relative humidity test using is situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.

3. Mechanical surface preparation

a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-6 as described by the International Concrete Repair Institute.

b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.

c. Wherever a free edge will occur, including doorways, wall perimeters, expansion joints, columns, doorways, drains and equipment pads, a ¼ inch deep by 1/4 inch wide keyways shall be cut in.

d. Cracks and joints (non-moving) greater than 1/4 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.

4. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.03 Applying Texture Finishes:

A. General:

1. The system shall be applied in three distinct steps as listed below:
   a. Substrate preparation
   b. Topping/overlay application with quartz aggregate broadcast.
   c. Topcoat application
2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Topping:

1. The topping shall be applied as a self-leveling system as specified. The topping shall be applied in one lift with a nominal thickness of 3/16 inch.
2. The topping shall be comprised of three components, a resin, hardener and filler as supplied by the Manufacturer.
3. The hardener shall be added to the resin and thoroughly dispersed by suitably approved mechanical means. Aggregate shall then be added to the catalyzed mixture and mixed in a manner to achieve a homogenous blend.
4. The topping shall be applied over horizontal surfaces using a pin rake, trowels or other systems approved by the Manufacturer.
5. Immediately upon placing, the topping shall be degassed with a 15/16 inch spiked roller.
6. Quartz aggregate shall be broadcast to excess into the wet material at the rate of 1 lbs/sf.
7. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

C. Topcoat:
   1. The topcoat shall be squeegee applied and back rolled with a coverage rate of 60 sf per kit
   2. The topcoat shall be comprised of a liquid resin and a liquid hardener that is mixed as a kit in and installed per the manufacturer's recommendations.
   3. The finish floor will have a nominal thickness of 1/4 inch.

3.04 Field Quality Control:

A. Tests, Inspection:
   1. The following tests shall be conducted by the Applicator:
      a. Temperature
         1. Air, substrate temperatures and, if applicable, dew point.
      b. Coverage Rates
         1. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.05 Cleaning and Protection:

A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.

B. Remove Masking – perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

End of Section

DIVISION 9 - FINISHES

SECTION 09681 – CARPET TILE

Part 1 - General

1.01 Work Included:

A. Work includes but is not limited to providing carpet tile and installation.

1.02 Quality Assurance:

A. Standards:

1. The carpet manufacturer shall have no less than fifteen years of production experience with modular carpet similar to type specified. Published product literature of carpet manufacturer must clearly indicate compliance of products with requirements of this section.

B. Installer Qualifications:

1. The installation provider must be directly responsible for the quality of the completed floor covering installation, including both the quality of the materials and labor used in the installation. The installation provider must directly warrant to owner that all products, materials and services related to the floor covering installation (including any floor covering(s),adhesive(s) and/or other products or materials used in the installation) will meet specifications set forth herein. The product warranty required herein must be provided directly by the carpet manufacturer.
2. The installation provider must have successful carpet installation experience similar to the work of this Section and be recommended, trained and approved by the carpet manufacturer.

1.03 Submittals:

A. Manufacturer’s Data - copies, as required, of carpet manufacturer’s specifications and installation instructions for carpet and related items specified.

B. Fiber Verification – Certification from the fiber producer verifying use of the premium branded, Post-Consumer Content Type 6 fiber in the submitted carpet product.

C. All applicable product warranties provided by manufacturer.

1.04 Delivery and Storage:

A. Deliver all materials to the installation site in the manufacturer’s original packaging. Packaging to contain

manufacturers name, identification number and related information.

B. Product to be delivered as required by manufacturer. Store in pallet form as supplied by manufacturer. Do not stack pallets.

C. Store materials in area of installation for a minimum period of 48 hours prior to installation.

1.05 Installation Quality Assurance:

A. Flooring contractor to be specialty contractor normally engaged in this type of work and shall have three (3) years minimum documented experience in the installation of these materials.

B. Flooring contractor and sub-contractors must be approved by the architect and/or the carpet manufacturer.

C. Flooring contractor will be responsible for the proper product installation, including floor preparation in all the areas indicated in the drawings to receive carpet. The carpet installation standard will be as listed in The Carpet and Rug Institute's **Standard for Installation of Commercial Carpet CRI-104.**

D. Flooring contractor to provide owner a written warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of no less than one (1) year after job completion.

F. Qualifications of Installers: All work shall be done by installation firms specializing in commercial carpet installation. It is required, that the firm shall be a member of the Floor Covering Installation Contractors Association (FCICA) and/or certified by the Floor Covering Installation Board (FCIB).

G. Floor temperatures must be a minimum of 65^0 for 24 hours prior to installation. Floor temperature can usually vary $5\text{-}10^0$ lower than room temperature. Modules must be conditioned to room temperature for 24 hours prior to installation. Relative humidity must be between 10%-65% maximum for 24 hours prior to installation. These conditions must also be maintained for 48 hours after completion of installation.

H. All carpet modules must be installed in the order they were manufactured. Select pallets in sequential order and follow the numbers located on each carton of tiles. Typically, an installation will begin with the lowest

carton numbers and progress through the highest numbers until project is complete.

I. Full Spread Adhesive System: Requires a full spread adhesive system for the most trouble free installation. Fully spread adhesive using a 1/32 x 1/16 x 1/16 "U" or "V" notch trowel. Allow to completely dry so adhesive does not transfer when touched. The proper amount of adhesive is mandatory to prevent the modules from shifting or moving.

1.06 Job Conditions:

A. Sub-floor preparation is to include all required work to prepare the existing floor for installation of the product as specified in this document.

B. Carpet installation shall not commence until painting and finishing work is complete and ceiling and overhead work is tested, approved, and completed.

C. Site conditions shall include those specified in the carpet manufacturer's installation manual and shall also include sufficient heat, light, and power required for effective and efficient working conditions.

1.07 Extra Materials:

A. Provide five percent (5%) extra material for shelf stock of carpet for each color and type specified.

1.08 Warranty - Carpet:

A. Warranties must be the standard, printed warranties on the carpet manufacturer's letterhead. All warranty items to be full term, not pro-rated for the indicated period. All warranties must be issued by the manufacturer as standard published warranties on all types of carpet within this document. If the product fails to perform as warranted when properly installed and maintained according to procedures, the affected area will be repaired or replaced at the expense of the manufacturer. The carpet manufacturer, will provide standard published written performance warranties for the following:

1. **Lifetime against excessive surface wear.** Excessive wear means no more than 10% loss of pile fiber weight measured before and after use as tested under ASTM D-3936.
2. **Lifetime static protection,** meaning built-in protection below 3.0 kv as tested under AATCC-134.

B. Carpet manufacturer shall warrant carpet manufactured with secondary backing for the useful life of the original installation against product failure from:

1. Tuft Bind (edge ravel, yarn pulls, zippering)
2. Delamination
3. Moisture Penetration
4. Dimensional Stability

C. All warranties to be sole source responsibility of the carpet manufacturer. Second source warranties that involve parties other than the carpet manufacturer are unacceptable.

D. Warranties shall not be written only for this purchase or purchaser. All warranties shall be standard issue nationally
of official documents.

1.09 Performance Insurance General:

A. Flammability Requirements:
1. Pill Test / DOC-FF-1-70 (ASTM D-2589)
Requirement: Pass
2. Flooring Radiant Panel / ASTM E-648
Requirement: Class 1 (Above .45 w/cm)
3. Optical Smoke Density Test / NFPA-258 NBS Smoke Chamber (ASTM E-662)
Requirement: Less than 450, Flaming Mode
4. Comply with the Carpet and Rug Institute (CRI) VOC Chamber Test/Indoor Air Quality test (CRI-IAQ) Green Label Test

B. Face Fiber Characteristics for **all** Carpets
1. Bulked Continuous Filament (BCF),
2. Acceptable Fiber Systems: as manufactured by Aquafil.

C. Sustainable Carpet Assessment Standard:
1. NSF - 140 Gold.
2. Carpet manufacturer and/or fiber producer must be a signatory of the National Carpet Recycling Agreement memorandum of understanding.

1.10 Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.

DIVISION 9 - FINISHES

SECTION 09681 – CARPET TILE

Part 2 - Products

2.01 General:

A. Certified test reports shall be submitted by the carpet manufacturer, for all performance assurance specifications listed below.

B. Requirements listed below must be met by all products being submitted for approval.

C. All submitted test numbers should represent average for standard production goods.

2.02 Product Specification - Modular carpet tile shall meet the following specifications:

A. Style: InterfaceFLOR

1) Color "A" – Field: Open Air Neutrals 410 Colorline.

2) Color "B" – Accent: Aerial Flying Colors AE317.

B. Yarn: 100% Nylon (with minimum 4% post-consumer content and +/- 60% total recycled content)

C. Dye Method: 100% Solution / Yarn Dyed

D. Pile Thickness: 0.093 inch

E. Density: 6,968

F. Backing System: CQuest GB

G. Color: refer to Room Finish Schedule.

H. Special Treatments: ProTekt

2.03 Minimum Construction Standards:

A. Nylon Specification - All nylon fiber shall be branded (premium) type 6 nylon from Aquafil with performance certification from the fiber manufacturer.

B. Antimicrobial, registered by the EPA for use in carpeting with broad spectrum efficacy against the growth of bacteria and fungi for a minimum of 15 years, assuming proper maintenance. The antimicrobial ingredient shall meet standards set by the U.S. General Services Administration (GSA) for Antimicrobial Carpet as supported by independent lab testing less than six months old.

1. Intersept (AATCC 138 Washed).
2. The preservative should be incorporated into the primary latex coating of the product during the manufacturing process, not topically applied to the carpet fibers.
3. The antimicrobial treated carpet when new must pass GSA parameters for treated carpets via AATCC method

174 parts II and III. Initial performance must be 90% reduction of the microorganisms (Staphylococcus aureus 6538 and Klebsiella pneumoniae 4352) and no fungal growth on either the primary backing or fibers both on washed (AATCC method 174) and non-washed samples.

4. The antimicrobial treated carpet must maintain, for the warranted life of the carpet, a minimum of 90% reduction of the microorganisms (Staphylococcus aureus 6538 and Klebsiella pneumoniae 4352) listed in AATCC method 171 part II, provided the carpet is maintained as specified. Additionally, the antimicrobial treated carpet must maintain a "no macroscopic growth" rating against Aspergillus niger 6275 at the primary backing in accordance with AATCC 171 part III.
5. The preservative must be environmentally responsible i.e. (biodegradable and not toxic to non-target species).
6. Efficacy of the preservative should be documented in professional peer reviewed scientific publications.

2.04 Related Carpet Materials:

A. Leveling compound - Latex type as recommended by carpet manufacturer. Must be compatible with carpet adhesive and curing/sealing compound on concrete.

B. Releasable pressure sensitive type adhesive – Adhesive must be water-based and allow for removal of carpet tile at any time without damage to carpet or substrate. Adhesive must contain antimicrobial preservative and have “zero” calculated VOC’s.

C. Carpet edge guard, non-metallic - Extruded or molded heavy duty vinyl or rubber carpet edge guard of size and profile indicated, and with minimum two inch wide anchorage flange; colors selected by architect/designer from among standard colors available within the industry.

D. Miscellaneous materials - As recommended by manufacturer of carpet. Other carpeting products to be selected by installation provider to meet project requirements.

E. Electrostatic (Dissipation low-generation):
   1. < 3.0 KV (AATCC 16-E).

F. Lightfastness:
   1. ≥ 4.0 @ 60 AFU’s.

SECTION 09681 – CARPET TILE

Part 3 - Execution

3.01 Installation:

A. General

1. Comply with manufacturer's instructions and recommendations for uniformity of direction.
2. Install carpet under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
3. Provide cut outs where required. Conceal cut edges with protective edge guards or overlapping flanges.
4. Run carpet under open bottom items such as heating convectors and install tight against walls, columns and cabinets so that the entire floor area is covered with carpet. Cover over all floor type door closures.
5. Install edging guard at all openings and doors wherever carpet terminates, unless indicated otherwise.
6. Cutting shall be done in accordance with the manufacturer's recommendation, using the tools designed for the carpet being installed.
7. Use leveling compound where necessary. Any floor filling or leveling shall have a minimum of 4'0" of feather.
8. Expansion joints - Do not bridge building expansion joints with continuous carpeting.

B. Installation

1. Install carpet according to carpet manufacturer's printed instructions and in accordance with the Carpet and Rug Institute's Installation Standard.

3.03 Cleaning and Protection:

A. On completion of the installation in each area, all dirt, carpet scraps, etc. must be removed from the surface of the carpet.

B. Remove debris, and sort pieces to be saved from scraps to be redirected and recycled.

C. Construction manager shall protect carpeting against damage during construction.

3.04 Inspection:

A. Upon completion of the installation, verify that work is complete, properly installed and acceptable.

End of Section

DIVISION 9 - FINISHES

SECTION 09900 - PAINTING

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this entire section of the work.
- B. Consult Drawings, finish schedules, details and specification section.

1.02 Quality Assurance:
- A. All painted surfaces shall be uniform in color, texture and finish to the satisfaction of the Architect.

1.03 Submittals:
- A. Submit manufacturer's specifications, including paint label analysis and application instructions for each material specified.
- B. Submit color samples for review of color and texture.
- C. Provide samples of all natural and stained wood finishes.
- D. Final samples: Prepare samples of finishes on the job to the satisfaction of the Architect. If required, a 4' x 8' portion of wall surface finished as final sample.

1.04 Product Deliver, Storage and Handling:
- A. Materials shall be delivered to the project site in strong, undamaged, waterproof containers with manufacturer's label intact. Materials in previously opened or unsealed containers, are not acceptable.
- B. Include on label of container: Manufacturer's name, type of paint, number and application instructions.
- C. Immediately upon delivery to the project site, all painter materials shall be stored and locked in a watertight shed with floor well off the ground. The shed shall remain locked at all times except for adding or removing materials.
- D. No materials of any manufacturer will be allowed on the project site any time during construction except those of the manufacturers specified or approved by the Architect.

1.05 Job Conditions:
- A. Comply with manufacturer's recommendations as to environmental conditions under which coating and coating systems can be applied.
- B. Do not apply finishes in areas where dust is being generated or where work in progress may affect finish quality.
- C. Protect finished work of other trades, and all surfaces not being painted concurrently, or not to be painted.

Part 2 - Products

2.01 General:
- A. The following specifications for Finishes is not intended to mention every particular item which will receive painter finish, but is intended to establish type and quality of finish which shall be required on various materials.
- B. **Products of Sherwin-Williams are specified herein to simplify descriptions of types and qualities of finishes required only.**

SECTION 09900 - PAINTING

Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.

C. Wherever the abbreviation "SW" appears in the following detailed specification, it shall be understood to mean Sherwin-Williams.

D. Primers shall be as specified by manufacturers of finish paint used and as approved by the Architect.

2.02 Acceptable Manufacturers:

A. Sherwin-Williams.

B. PPG Industries.

C. Cook Paint and Varnish Co.

D. Pratt and Lambert.

E Kelly-Moore.

2.02 Exterior Finishes:

A. Enamel on Ferrous Metals:

1. One coat SW Kem Kromik Primer, (Alkyd primer).
2. Two coats SW Industrial Enamel, (Alkyd gloss enamel).

B. Enamel on Exterior Door Frames and Doors:

1. Shop coat by others-touch up as required.
2. Two coats SW Industrial Enamel, (Alkyd gloss enamel).

C. Enamel on Galvanized Metal:

1. One Coat SW Galvite primer.
2. 2 Coats SW Industrial Enamel, (Alkyd gloss enamel).

D. Enamel on Exterior Concrete Block:

1. One coat SW Promar Latex Block Filler B25W25.
2. Two coats SW A-100 Semi-Gloss Latex Enamel.

2.03 Interior Finishes:

A. Enamel on Metal: All miscellaneous and ornamental metal items which are left exposed, hollow metal doors and frames.

1. Shop coat by others - touch up as required.
2. Two coats SW Promar 200 Semi-Gloss. Enamel, (Alkyd semi-gloss enamel).

B. Enamel on Concrete Block:

1. One coat SW Promar 200 Block Filler (vinyl acrylic latex).
2. Two coats SW Promar 200 Semi-Gloss Enamel.

C. Enamel on Gypsum Board Ceilings/Facias/Walls

1. One coat SW Promar 200 Wall Primer with Medium Texture. (Vinyl Acrylic Latex Wall Primer.)
2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

D. Tape and Float: Joints on Gypsum Board.

1. As per manufacturer's instructions.
2. All joints shall be sanded ready for primer's finish.

E. Interior Millwork and Cabinetry:

1. One coat SW Promar 200 Alkyd Enamel Primer/Undercoat.
2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

F. Enamel on Wood Trim:

1. One coat SW Promar 200 Alkyd Enamel Primer/Undercoat.
2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

G. Back-Painting, Interior Work:

1. Two coats SW Promar 200 Alkyd Enamel Primer/Undercoat.

H. Enamel on Exposed Metal Piping:
   1. One coat SW Galvite primer.
   2. Two coats SW Promar 200 Semi-Gloss Latex Enamel.

Part 3 - Execution

3.01 Inspection:
   A. Notify Contractor of any surface not in proper condition to be finished before proceeding with the work. Starting work will constitute the painter's acceptance of preceding work, and conditions under which finish will be applied and his assumption of responsibility for results to be obtained.

3.02 Preparation of Surfaces:
   A. Wood:
      1. Sand to a smooth even surface, then dust off.
      2. Touch-up knots, resinous spots, etc., on all surfaces with shellac 18 hours before applying prime coat.
      3. Fill nail holes, cracks and blemishes flush after priming coat has dried.
   B. Concrete Block and Concrete:
      1. Repair cracks and irregularities to provide uniform surface texture.
   C. Ferrous Metal Surfaces:
      1. Remove rust and scale, clean grease or oil surfaces with turpentine or benzine before painting.

3.03 Application:
   A. Number of coats and quality of finish shall be in accordance with these specifications, which requires the use of material which will product first quality finish if properly applied.
   B. Apply coats of material in strict accordance with manufacturer's currently published specifications, except where requirements of these specifications are in excess or manufacturer's requirements.
   C. Except as otherwise approved by the Architect, the first two coats of painter's finish shall be applied by roller or brush application. Finish coats may be applied by spray application.
   D. Comply with recommendation of product manufacturer for drying time between succeeding coats allow additional as required until finish is dry.
   E. All work where a coat of material has been applied must be inspected and approved before application of succeeding coat, otherwise, no credit for the coat well be given. Notify Architect when a particular coat has been completed for inspection and approval.
   F. Shellacs, oils, turpentine, etc., shall be of the highest quality and subject to approval of Architect. Materials shall be mixed in and applied directly from containers which they are purchased except when use of other containers is approved.
   G. First Coat of all finishes, except of varnish and stains, shall be white.

H. Sand lightly between coats where shellac, varnish or enamel is used.

I. Remove all hardware, accessories, machined surfaces, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting operations.

3.04 Clean-up:

A. Clean and paint spots from work and touch-up or otherwise repair any defective or damaged work.

B. Remove all surplus materials and equipment after work is completed.

C. Leave entire job clean and acceptable to the Architect.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10100 - CHALKBOARDS AND TACKBOARDS

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this section of the work.

1.02 Quality Assurance:
- A. Standards:
  - 1. American Society for Testing and Materials:
    - a. ASTM A-424, Steel Sheets for Porcelain Enameling.
  - 2. Federal Specifications:
    - a. LL-B-810B, Hardboard.
  - 3. Military Specifications:
    - a. MIL-C-15116C, Cork Sheet.

1.03 Submittals:
- A. Shop Drawings: Submit dimensioned ship Drawings indicating location, type, size, arrangement, adhesive, backing, anchor or mounting details, trim, and accessories.
- B. Submit samples showing the full range of colors available for each unit.

Part 2 - Products

2.01 Materials:
- A. Porcelain Enamel Steel Markerboards:
  - 1. Type: Factory-built aluminum framed unit.
  - 2. Construction: Factory LCS face on 24 gauge steel laminated to 3/8" hardboard with .015 aluminum back-up.
  - 3. Color: LCS faces shall be white.
  - 4. Trim: Provide "H" bar joint cover at adjacent panels, color to match narrow leg showing, map rail with cork inserts and chalk trough.
  - 5. Accessories: Provide two map hooks with paper clips at each chalkboard unit.
  - 6. Mounting System: Concealed metal spline system. **At exterior walls provide "stand-off" mounting brackets to prevent condensation behind boards.**
- B. Tackboard:
  - 1. Type: Factory-built aluminum framed unit.
  - 2. Construction: Vinyl covered surface bonded to a 2" thick insulation board core, with a 7/8" x 5/8" aluminum frame. Refer to Color Schedule.
  - 3. Mount System: Manufacturer's standard.
  - 4. Acceptable manufacturer: Best-Rite Vin-Tak tackboards.

SECTION 10100 - CHALKBOARDS AND TACKBOARDS

Part 3 - Execution

3.01 Installation:

A. Install units straight, plumb, and level with metal splice system. Refer to Drawings.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10150 - COMPARTMENTS AND CUBICLES

Part 1 - General

1.01 Description:
- A. Stainless steel compartment work includes the following:
  1. Floor-supported, overhead-braced partitions.
- B. Furnish all labor and materials necessary for the completion of work in this section as shown on the contract drawings and specified herein.
- C. Work in this section shall include, but is not limited to:
  1. Toilet compartments.
  2. Hardware for toilet compartments and stainless steel partitions.
  3. Shop drawings and working drawings.
  4. Manufacturer's guarantee.
- D. Related work specified elsewhere shall include accessories and anchorage/blocking for attachment of compartments.

1.02 Products:
- A. Stainless steel finish shall be selected from the manufacturer's full range.
- B. Hardware samples shall be submitted for approval to the Architect upon request.

1.03 Warranty:
- A. Provide manufacturer's standard 15 year warranty.

1.04 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Manufacturer:
- A. Toilet compartments, and urinal screens shall be by MILLS BRADLEY Corp., Deer Park, New York, or approved equal.

2.02 Materials:
- A. Doors, panels, and pilasters to be 1" thick type 304 stainless steel which are waterproof and non-absorbent.

2.03 Construction:
- A. Doors, panels, and pilasters shall be 1" thick with uniformly machined edges.
- B. Doors and panels shall be 55" high and mounted at 14" above the finished floor. Door shall be mounted to the pilasters with an integral hinge or a "bank-vault" type die-cast aluminum alloy wraparound hinge.
- C. Pilasters shall be 81-1/2" high and anchored to the panels and walls with three 2" long heavy-duty aluminum stirrup brackets.

Pilasters shall include a mounting system comprised of at least one 3/8" x 1" steel mounting bar attached to the pilaster, having 3/8" steel-plated bolts secured to 1/8" semicylindrical plug loc imbedded within a contoured aperture transversely piercing the core. Each mounting bar shall be secured to the building structure with 3/8" steel-plated studs. A 4-piece shoe shall conceal each floor mounting, having an internal cross section conforming to the pilaster and fabricated from type 304 stainless steel having a #4 finish.

D. Pilasters are overhead braced with an extruded anti-grip aluminum headrail.

E. Urinal Partitions: Shall have full height aluminum wall brackets and shall be overhead-braced.

2.04 Hardware:

E. Door hardware shall be as noted:

1. Integral hinges shall be fabricated into the door and the pilaster with no exposed metal parts. The hinge mechanism is integrated into the door and pilaster with a 1/2" diameter nylon gravity/cam unit with a 3/16" stainless steel center pin (at bottom) and a 1/2" nylon rod (at top). Integral hinges are not factory set and are installed at the job site. Pilaster shall be a minimum of 5" wide.
2. Heavy-duty "Bank Vault" hinge shall have gravity-acting cams and are fabricated from a die cast aluminum alloy with a brushed polish chrome-plated finish and wraparound flanges. The cam is constructed from a 3/4" diameter nylon rod and a 3/8" stainless steel pin. Hinges are through-bolted onto doors and pilasters using stainless steel, tamper-resistant through bolts. Hinges are easily adjusted at the job site to a full close or partially open position, as required.
3. Aluminum stirrup brackets shall be 2" long made of heavy-duty anodized extruded aluminum (6063-T5 alloy). Stirrup brackets shall be 1/8" thick and mounted with stainless steel, tamper-resistant screws. Panels shall be attached with stainless steel, tamper-resistant through bolts. The attachment of brackets to the adjacent wall construction shall be accomplished with #14 x 2-1/2" stainless steel, tamper-resistant screws and plastic anchors.

B. Stainless steel pilaster shoes shall be 5-1/2" high, constructed from 22-gauge stainless steel. Pilaster shoes are anchored to the pilaster with #14 stainless steel, tamper-resistant screws.

C. Slide latches shall be fabricated from a die cast aluminum alloy with a brushed polish chrome-plated finish and mounted to the

door with stainless steel, tamper-resistant through bolts.

D. Strike and keepers shall be fabricated from a die cast aluminum alloy with a brushed polish chrome-plated finish. Keepers provide for emergency access into the stall by lifting up on the bottom of the door. Strikes and keepers shall be attached to the doors and pilasters with stainless steel through bolts.

E. Headrail shall be made of heavy-duty anodized extruded aluminum (6063-T5 alloy). Headrail is anti-grip and attaches to the top of the pilaster with stainless steel, tamper-resistant screws. Headrail is attached to the adjacent wall construction with a die cast headrail bracket.

F. Headrail brackets shall be made from a die cast aluminum alloy and shall be attached to the adjacent wall construction with #14 x 2-1/2" stainless steel, tamper-resistant screws and plastic anchors.

Part 3 - Execution

3.01 Preparation:

A. Examine areas to receive toilet compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that may affect installation of compartments. Report any discrepancies to the architect.

B. Take complete and accurate measurements of complete toilet compartment locations.

C. Start of work constitutes acceptance of job.

3.02 Installation:

A. Install compartments in a rigid, straight, plumb and level manner, with steel laid out as shown on the shop drawings and manufacturer’s installation instructions.

B. All doors and panels to be mounted at 14" above the finished floor.

C. Clearance at vertical edges of door shall be uniform top to bottom.

D. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.

E. Finished surfaces shall be cleaned after installation and be left free of all imperfections.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10400 - INTERIOR SIGNAGE

Part 1 - General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this entire section of the work.

1.02 Quality Assurance:
- A. Standards:
  1. UFAS Fed. Std. 795-Requirements for the physically handicapped.
  2. MIL Spec. L-P-387a, type NDP, rated self-extinguishing, for sign materials.

1.03 Submittals:
- A. Provide manufacturer's catalog cut and data sheets, complete parts list and installation requirements for each item specified.
- B. Schedules: Indicate location and placement for all graphic items.

1.04 Product Delivery, Storage and Handling:
- A. Handle and store all items with care to prevent damage and injury to finish surfaces.

Part 2 - Products

2.01 Products of the manufacturers listed below have been specified herein to simplify descriptions of design, construction, and materials only. All items have been selected for visual and performance design quality which shall serve as a basis for acceptance of equivalent products by other manufacturers.

2.02 Signage System:
- A. Material: 1/8 inch thick, type ES melamine plastic.
- B. Size: 8" x 8" x 1/8", with 1/2" radius corners. Custom design - refer to 2.04 for text and symbols.
- C. Mounting: All graphics shall be permanently mounted to wall or door surface with tamper resistant screws.
- D. Color: black background with white letters. Submit color samples with submittals, prior to approval. **Colors will be a factor in product acceptance.**
- E. Letter Style: Helvetica Medium.
- F. Standard Grade 2 braille shall be below all copy, all signs.
- G. All graphic material shall meet the requirements of UFAS Fed. Std. 795, and MIL spec L-P-387a.
- H. Acceptable Manufacturer: Series 200A, Type D format, Mohawk Sign systems.

2.03 Plaque Groupings Required (letter designation refers to 2.04):

Quantity	Plaque	Mounting Location

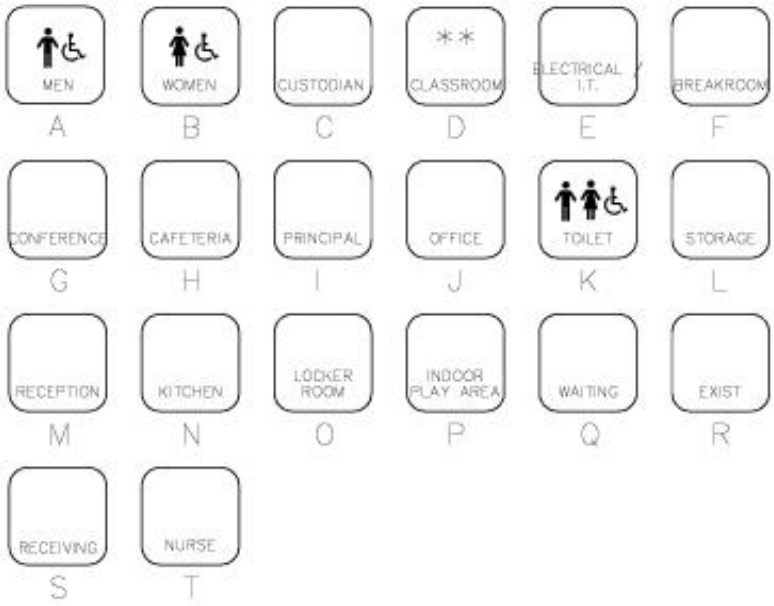
**Coordinate location with Architect

Plaque	**Quantity**	**Location**
A	2	1 each @ doors no. 53 & 59
B	2	1 each @ doors no. 54 & 60
C	1	1 each @ door no. 39
D	21	1 each @ doors no. 22, 24, 26, 30, 31, 33, 34, 37, 42, 44, 46, 49, 50, 57, 62, 64, 68, 69, 72, 75, & 76
E	4	1 each @ doors no. 40, 41, ** & **
F	1	1 each @ door no. 19
G	2	1 each @ doors no. 16 & 18
H	1	1 each @ door no. 68
I	1	1 each @ door no. 15
J	5	1 each @ doors no. 12, 13, 14, 17, & 81
K	19	1 each @ doors no. 20, 23, 25, 27, 28, 29, 32, 35, 36, 45, 47, 48, 51, 58, 63, 65, 66, 70, & 71
L	4	1 each @ doors no. 55, 61, 82, & **
M	1	1 each @ door no. 11
N	1	1 each @ door no. 77
O	1	1 each @ door no. 79
P	2	1 each @ doors no. 56 & 67
Q	1	1 each @ door no. 10

SECTION 10400 - INTERIOR SIGNAGE

R	5	1 each @ doors no. 3, 5, 7, 9, & 10
S	1	1 each @ door no. 38
T	1	1 each @ door no. 21

2.04 Signage Plaques Required:

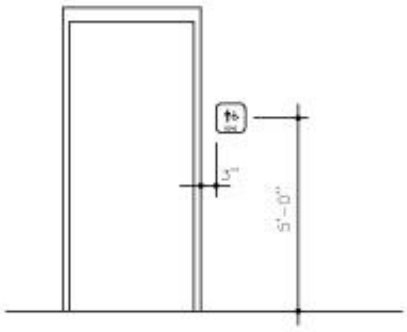


Note: all signage plaques shall have grade 2 braille translations under text.

* INDICATES FLOOR LEVEL (L THRU 3) @ EACH STAIR WAY (8 TOTAL SIGNS)

** INDICATES INFORMATION TO BE COORDINATED WITH ARCHITECT

2.05 Typical Mounting:



Mounting Height

Typical Wall Location

Verify location with architect.

Part 3 - Execution

3.01 Installation:

A. Comply with manufacturer's installation instructions and details on the Drawings. Set all units plumb and level in location indicated on the Drawings or as directed.

B. Provide all necessary accessories: Items to support or attach Identifying Devices to result in a complete installation.

C. Protect all signage plaques to prevent damage after installation.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10420 - LETTERS AND PLAQUES

Part 1 General

1.01 Work Included:
- A. All materials, labor, services, and incidentals necessary for the completion of this entire section of the work.

1.02 Submittals:
- A. Shop Drawings: Indicate details and dimensions of fabrication and installation including layouts and assemblies. Begin fabrication only after receiving approved shop Drawings.
- B. Manufacturer's Literature: Descriptive literature and installation instructions.

1.03 Product Delivery, Storage, and Handling:
- A. Handle and store all items with care to prevent damage and injury to finish surfaces.

Part 2 - Products

2.01 Cast Letters at interior locations:
- A. Finish: Clear anodized aluminum finish.
- B. Color: **Color will be a factor in product selection.**
- C. Letter Style: **OPTIMA.**
- D. Size: height - **12".**
- E. Mounting: Projected mounting with 1" spacer sleeve.
- F. Quantity: Sufficient letters to spell out the following (quantities in parentheses):

    1. **RECEPTION** (x 1)

- G. Verify exact spelling/punctuation with Architect.
- H. Location: refer to the Drawings.
- I. Acceptable Manufacturer: A.R.K. Ramos, Oklahoma City.

2.02 Cast Letters at exterior locations:
- A. Finish: painted finish.
- B. Color: **BLACK.**
- C. Letter Style: **OPTIMA.**
- D. Size: height - **24" at building name / 12" at address.**
- E. Mounting: concealed fasteners. Provide bracing (channels, metal studs, etc.) to interior of building as required to properly mount/anchor letters.
- F. Quantity: Sufficient letters to spell out the following (quantities in parentheses):

    2. **MOORE PUBLIC SCHOOLS – CHILD CARE CENTER** (24" X 1)
    3. **201 NORTH EASTERN AVENUE**

- G. Verify exact spelling/punctuation with Architect.

H. Location: refer to the Drawings.

I. Acceptable Manufacturer: A.R.K. Ramos, Oklahoma City.

2.03 Cast Metal Plaque at interior location:

A. Castings shall be free from pits, scale, sand holes, or other defects. Comply with requirements specified for metal, border style, background texture, and finish, and with requirements shown for thickness, size, shape, and copy. Hand-tool and buff borders and raised copy to produce the manufacturer's standard satin polished finish. **Coordinate final design with Architect.**

1. Metal: aluminum.
2. Border Style: Type 504.
3. Background Texture: manufacturer's standard No. 2 black pebble texture.
4. Letter Style: Helvetica upper case – raised satin aluminum finish.
5. Mounting Method: No. 4 concealed fasteners.
6. Finish: manufacturer's satin aluminum finish.
7. Size: 20 inches x 24 inches.
8. Content **(coordinate final layout with Architect)**:

CHILD CARE CENTER
MOORE PUBLIC SCHOOLS

SUPERINTENDENT OF SCHOOLS:
DR. ROBERT ROMINES

BOARD OF EDUCATION:

MANDY KINCANNON	PRESIDENT
ERIN MORRISON	VICE PRESIDENT
ALLISON RICHEY	MEMBER
STACI PRUETT	MEMBER
JENNY NGUYEN-STATLER	MEMBER

ASSISTANT SUPERINTENDENT – OPERATIONS:
JEFF HORN

ARCHITECT:
AGP – THE ABLA GRIFFIN PARTNERSHIP LLC
MOORE, OKLAHOMA

CONTRACTOR:
OMNI CONSTRUCTION LLC
MOORE, OKLAHOMA

9. Type Example: ARK-Ramos Manufacturing Company, Inc.
10. Location: locate in Room #401, "Waiting Area" as directed by Architect.

Part 3 - Execution

3.01 Installation:

A. Install units plumb and level in locations indicated on the Drawings, following manufacturer's recommendations.
B. Provide all necessary accessories: Items to support or attach metal letters to result in a complete installation.
C. Protect all finishes to prevent damage before, during and after installation.

End of Section

SECTION 10500 - LOCKERS

Part 1 General

1.01 Work Included:
- A. All materials, labor, services, and incidentals necessary for the completion of this entire section of the work.

1.02 Submittals:
- A. Shop Drawings: Indicate details and dimensions of fabrication and installation including layouts and assemblies. Begin fabrication only after receiving approved shop Drawings.
- B. Manufacturer's Literature: Descriptive literature and installation instructions.

1.03 Product Delivery, Storage, and Handling:
- A. Handle and store all items with care to prevent damage and injury to finish surfaces.
- B. Protect adjacent existing surfaces from damage.

1.04 Quality Assurance:
- A. Standards:
  1. Federal Specification: AA-L-486.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. **Lockers Type 1** - Double Tier "Quiet" Lockers - at the Kitchen Locker Room – 4 / 8 units:
  1. Construction: Each unit shall have individual door and frame of cold rolled steel.
     - a. Body: shall be 16 gauge steel, flanged to give double thickness of metal at back vertical corners; 18 gauge backs.
     - b. Door Frame: shall be 16 gauge steel formed channels with vertical members having an additional flange to form continuous door strike. Corners shall be lapped and welded into a rigid assembly; in addition, bottom cross members shall have tang at each end that fits through slot in rear slot of upright frame member to prevent twisting out of alignment. Top and bottom cross members shall provide support for front edge of locker top and locker bottom.

c. Door: shall be 14 gauge steel, one piece, with both vertical edges formed into a channel shape and top and bottom flanged at 90 degree angle. Welded construction with reinforced top and bottom with intermediate stiffener ribs, grind and finish all edges smooth.
d. Coat Hooks: provide three single prong coat hooks made of cadmium-plated or zinc-plated steel.
e. Ventilation: door perimeter and verti-vents.

2. Quantity: Refer to Drawings.
3. Size: 15"w x 18"d x 36"h per tier for a total locker height of 72”.
4. Base: None - mount to top of continuous concrete masonry / wood framed base.
5. Hardware:
   a. Hinge to be full loop, 2" 5-knuckle hinges nested in door slot, welded to frame and double-riveted to door.
   b. Handle to be stainless steel recessed handle with plastic-protected lifting trigger. Must be able to accept padlock and meet ADA requirements for accessibility.
   c. Latching to be quiet, multi-point latching on heavy gauge frame hooks with rubber silencers. Concealed quiet lock bar locked in place and isolated from metal to metal contact by polyethylene glides.
6. Provide aluminum number plates – coordinate numbering system with Architect.
7. Provide end finishing panels to closeout to adjacent / perpendicular walls and at corners.
8. Color: refer to Color Schedule.

B. General: Locker manufacturer shall provide all appropriate matching trim and closure pieces for a complete and finished installation.

B. Acceptable Manufacturer: Republic Storage Systems.

Part 3 - Execution

3.01 Installation:

A. Field verify prepared bases are in correct position and configuration.
B. Install equipment as located on the Drawings and comply with manufacturer's written instructions for equipment

provided.
Secure lockers with anchor devices with a minimum pull-out force of 100 lbs.
Provide any additional items necessary for support or to complete installation.

C. Clean work after installation including locker interior and exterior surfaces.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10520 - FIRE PROTECTION SPECIALTIES

Part 1 General

1.01 Work Included:
- A. All materials, labor, services and incidentals necessary for the completion of this entire section of the work.

1.02 Submittals:
- A. Submit Manufacturer's Literature: Descriptive literature, product data and installation instructions.

1.03 Product Delivery, Storage and Handling:
- A. Handle and store all items with care to prevent damage to equipment. Damaged equipment shall be rejected.

1.04 Quality Assurance:
- A. Standards:
  1. Conform to NFPA 10 requirements for portable fire extinguishers.
- B. Provide fire extinguishers, cabinets and accessories by a single manufacturer.

1.05 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 Materials:
- A. Fire Extinguishers:
  1. Model No. 10E - Cosmic multi-purpose dry chemical fire extinguisher. UL, 4A-60-BC.
- B. Fire Extinguisher Cabinets:
  1. Model No.: Academy 1026V10 with return trim as required with rolled edge.
  2. Door Style: Contemporary V, with flat trim.
  3. Glazing: 1/4" clear acrylic.
  4. Finish: Aluminum, mill finish, clear anodized.
  5. Fire Rated Enclosure: provide fire stopping material to protect integrity of fire rated partition as required by applicable codes and standards.

Part 3 - Execution

3.01 Installation:
- A. Install equipment as located on the Drawings and comply with manufacturer's written instructions for equipment provided.
- B. Prepare recesses in walls for fire extinguisher cabinets as required for type and size of cabinet and style of trim, and

to comply with manufacturer's instructions.

C. Securely fasten mounting brackets and fire extinguisher cabinets to the structure, square and plumb, to comply with manufacturer's instructions.

D. Check extinguishers for proper charge operation.

E. Remove and replace damaged, defective or under charged units.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10650 - OPERABLE PARTITIONS

Part 1 - General

1.01 Description:
- A. General:
  1. Furnish and install operable partitions and suspension system. Provide all labor, materials, tools, equipment, and services for operable walls in accordance with provisions of contract documents.

1.02 Related Work By Others:
- A. Any deviation of site conditions contrary to approved shop drawings must be called to the attention of the Contracting Officer.
- B. All header, blocking, support structures, jambs, track enclosures, surrounding insulation, and sound baffles as required in 1.04 Quality Assurance.
- C. Prepunching of support structure in accordance with approved shop drawings.
- D. Paint or otherwise finishing all trim and other materials adjoining head and jamb of operable partitions.

1.03 Submittals:
- A. Complete shop drawings shall be provided prior to fabrication indicating construction and installation details.

1.04 Quality Assurance:
- A. Preparation of the opening shall conform to the criteria set forth per ASTM E557 Standard Practice for Architectural Application and Installation of Operable Partitions.
- B. The partition STC (Sound Transmission Classification) shall be achieved per the standard test methods ASTM E90.
- C. Noise isolation classifications shall be achieved per the standard test methods ASTM E336 and ASTM E413.
- D. Noise Reduction Coefficient (NRC) ratings shall be per ASTM C423.
- E. The manufacturer shall have a quality system that is registered to the ISO 9001 standards.
- F. Rack testing for 10 years (tensional strength stress test).

1.05 Product, Delivery, Storage, And Handling:
- A. Provide proper storage of partitions before installation and continued protection during and after installation.

1.06 Warranty:
- A. Provide Manufacturer’s standard warranty.

1.07 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

SECTION 10650 - OPERABLE PARTITIONS

Part 2 - Products

2.01 Acceptable Manufacturer:

A. Materials:
   1. Product shall be top supported, Series 642 paired panels as manufactured by Hufcor Inc.

B. Construction:
   1. Panels shall be nominally 4” thick, to 48” in width, and hinged in groups of two.
   2. Panel faces shall be laminated to appropriate substrates to meet the STC requirement in 2.04 Acoustical Performance.
   3. Frames shall be of 16 gauge painted steel with factory applied aluminum vertical edge and face protection.
   4. Vertical interlock seals between panels shall provide minimum 1-1/4” panel-to-panel interlock. The lead panel shall seal against the adjacent wall without the need for wall mounted jambs.
   5. Horizontal top seals shall be retractable, provide 1” nominal operating clearance, and exert upward force when extended.
   6. Horizontal bottom seals shall be retractable, provide a maximum of 2” nominal operating clearance, and exert downward force when extended.
   7. Horizontal trim shall be of aluminum.
   8. Hinges on basic panels shall be of steel and project no more than 1/4” beyond panel faces. Each pair of panels shall have a minimum of three hinges.

B. Weight of the panels shall be 7.8-13.6 lbs. per sq. ft. based on options selected.

C. Suspension system:
   1. Track shall be of clear anodized architectural grade extruded aluminum alloy 6063-T6. Track design shall provide integral support for adjoining ceiling, soffit, or plenum sound barrier. Track shall be connected to the structural support by min. 3/8” dia. threaded steel hanger rods. Guide rails and/or track sweep seals shall not be required.
      a. Each panel shall be supported by one 4-wheeled carrier. Wheels shall be of hardened steel ball bearings encased with molded polymer tires.

D. Finishes:
   1. Face finish shall be:
      a. Factory applied high pressure laminate. Color shall be selected from manufacturer’s standard color selections.

2. Frame and horizontal trim color shall be:
   a. Gray (standard)
3. Aluminum track shall be clear anodized.

2.03 Operation:

A. Panels shall be manually moved from the storage area, positioned in the opening, and seals set.

B. Retractable Horizontal Seals
1. Retractable horizontal seals shall be activated by a removable quick-set operating handle located approximately 42” from the floor in the panel edge.
2. All retractable seals in each hinged panel group shall be operated simultaneously.
3. Seal activation requires approximately 15 lbs. of force per panel and approximately a 190 degree turn of the removable handle.

C. Final partition closure to be by:
1. Expanding jamb which compensates for minor wall irregularities and provides a minimum of 250 lbs. seal force against the adjacent wall for optimum sound control. The jamb activator shall be located approximately 45” from the floor in the panel face and be accessed from either side of the panel. The jamb shall be equipped with a mechanical rack and pinion gear drive mechanism and shall extend 4”-6” by turning the removable operating handle.

D. Stack/Store Panels
1. Retract seals with removable operating handle and move to storage area.

2.04 Acoustical Performance:

A. Acoustical performance shall be tested at a laboratory accredited by the U.S. Dept. of Commerce, National Institute of Standards and Technology, under the National Voluntary Laboratory Accreditation Program (NVLAP) and in accordance with ASTM E90 Test Standards. Standard panel construction shall have obtained an STC rating of 43.
1. Complete, unaltered written test report is to be made available upon request.

Part 3 - Execution

3.01 Installation:

C. The complete installation of the operable wall system shall be by an authorized factory-trained installer and be in strict accordance with the approved shop drawings and manufacturer’s standard printed specifications, instructions, and recommendations.

3.02 Cleaning:

A. All track and panel surfaces shall be wiped clean and free of handprints, grease, and soil.

B. Cartoning and other installation debris shall be removed from the job site.

3.03 Training:

A. Contractor shall demonstrate proper operation and maintenance procedures to Contracting Officer's representative.

B. Operating handle and owners manuals shall be provided to Contracting Officer.

End of Section

DIVISION 10 - SPECIALTIES

SECTION 10800 - TOILET AND BATH ACCESSORIES

Part 1 - General

1.01 Work Included:
A. All materials, labor, services, and incidentals necessary for the completion of this section of the work.

1.02 Submittals:
A. Provide manufacturer's catalog cut and data sheets, complete parts list and installation requirements for each accessory item specified.
B. Where applicable, submit maintenance data, operating instructions and keys required for each type of equipment and lock.

1.03 **Products of certain manufacturers are specified herein to simplify descriptions of design, construction, and/or materials only. Proprietary names are not intended to imply that products of named manufacturer are required to the exclusion of equivalent products of other manufacturers.**

Part 2 - Products

2.01 The following model numbers refer to products of Bradley Corporation (except where noted otherwise).

2.02 Accessories:
A. Grab Bars:
1. Model No. 8120-001360-36".
2. Quantity: 1 each @ rooms 001a, 001b, 001c, 001d, 001e, 101a, 101b, 101c, 101d, 101e, 201a, 201b, 201c, 201d, 201e, 301a, 301b, 301c, 301d, 301e, 413, 414, 417a, 417b, 416b, 423, and 436a

B. Grab Bars:
1. Model No. 8120-001420-42".
2. Quantity: 1 each @ rooms 001a, 001b, 001c, 001d, 001e, 101a, 101b, 101c, 101d, 101e, 201a, 201b, 201c, 201d, 201e, 301a, 301b, 301c, 301d, 301e, 413, 414, 417a, 417b, 416b, 423, and 436a

C. Grab Bars:
1. Model No. 8120-001180-18".
2. Quantity: 1 each @ rooms 001a, 001b, 001c, 001d, 001e, 101a, 101b, 101c, 101d, 101e, 201a, 201b, 201c, 201d, 201e, 301a, 301b, 301c, 301d, 301e, 413, 414, 417a, 417b, 416b, 423, and 436a

D. Tilted Stainless Steel Mirror (Frame and Surface):
1. Model No. 740-1830.
2. Quantity: 1 each @ rooms 001a, 001b, 001c, 001d, 001e, 101a, 101b, 101c, 101d, 101e, 201a, 201b, 201c, 201d, 201e, 301a, 301b, 301c, 301d, 301e, 413, 414, 417a, 417b, 416b, 423, and 436a (above

lavatories)

E. Custodian's Utility Shelf/With Mop & Broom Holder:
   1. Model No. 9984, 36" long.
   2. Quantity: 1 @ room 433

G. Toilet Paper Dispenser to be provided by Owner and installed by Contractor.
   1. Quantity: 1 each @ rooms 001a, 001b, 001c, 001d, 001e, 101a, 101b, 101c, 101d, 101e, 201b, 201c, 413, 414, 417a, 417b, 416b, 423, and 436a
      2 each @ rooms 201a, 201d, 201e, 301a, 301b, 301c, 301d, and 301e

H. Paper Towel Dispenser to be provided by Owner and installed by Contractor.
   1. Quantity: 1 each @ rooms 001a, 001b, 001c, 001d, 001e, 101a, 101b, 101c, 101d, 101e, 201a, 201b, 201c, 201d, 201e, 301a, 301b, 301c, 301d, 301e, 413, 414, 417a, 417b, 416b, 423, 436a and 427

I. Soap Dispenser to be provided by Owner and installed by Contractor.
   1. Quantity: 1 each @ rooms 001a, 001b, 001c, 001d, 001e, 101a, 101b, 101c, 101d, 101e, 201a, 201b, 201c, 201d, 201e, 301a, 301b, 301c, 301d, 301e, 413, 414, 417a, 417b, 416b, 423, 436a and 427

Part 3 - Execution

3.01 General:

A. Install where noted on the Drawings and mount as indicated or per manufacturer's recommendations.

B. Use concealed or tamper-proof fasteners of same material and finish as unit. Provide anchors, bolts, and other mounting devices and attach units securely.

End of Section