

SPECIFICATIONS THE BAY HOUSE

MIDDLE STREET
PORTLAND, MAINE
JULY 15, 2008

OWNER:
THE VILLAGE AT OCEAN GATE, LLC.
c/o Atlas Investment Group, LLC
35 Fay Street, Suite 107B
Boston, Massachusetts 02118

ARCHITECT:
DAVID M. WHITE, ARCHITECT
403 Tibbetts Hill Road
P.O. Box 447
Goffstown, NH 03045



SIGNATURE PAGE

THE VILLAGE AT OCEAN GATE, LLC. Owner
c/o Atlas Investment Group, LLC
35 Fay Street, Suite 107B
Boston, Massachusetts 02118

Signature Title Date

DAVID M. WHITE, ARCHITECT Architect
403 Tibbetts Hill Road
P.O. Box 447
Goffstown, New Hampshire 03045

Signature Title Date

Portland Builders, Inc. Contractor
PO Box 4902
Portland, ME 04112

Signature Title Date

XXX Bonding Company
xxx
xxx
xxx

Signature Title Date

XXX Lender
xxx
XXX

Signature Title Date

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1. Provide by Others

GENERAL CONDITIONS



REFER TO:

AIA DOCUMENT A201-1997

General Conditions of the Contract for construction

A copy of the General Conditions is not included in this set due to copyright laws. It is understood that all parties to this contract, including contractors and sub-contractor, have read and understand the document referenced above. The original General Conditions document is bound into the contract sets of the Specifications for this project. Anyone may purchase their own copy of the General Conditions at the following location:

AIANH
P.O. Box 398
Keene, NH 03431

Telephone: (603) 357-2863
FAX: (603) 357-0835

SUPPLEMENTARY GENERAL CONDITIONS



SUPPLEMENTARY GENERAL CONDITIONS

GENERAL:

The Supplementary General Conditions, hereinafter abbreviated as SGC, shall be the only document that alters or modifies the General Conditions of the Contract for Construction, AIA Document A201 (AIA GC) 1997 edition. The unaltered or unmodified portions of the AIA GC shall be in full effect.

The paragraph numbers in the SGC correspond to or are in consecutive order with those in the AIA GC.

Article 1 - General Provisions:

Add a new paragraph 1.1.8 as follows:

"The word "Approved" used without further qualifications shall be understood to mean "Approved by the Architect"."

The work referred to as "reasonably inferable" in paragraph 1.2.3 shall include, but not limited to, furnishing and installing all anchors, ties, bolts and other items not specifically shown or called for but necessary to secure parts of the work required by the Contract Documents.

Article 2 - Owner

Delete Section 2.2.5 and substitute the following:

"The Contractor will be furnished, at no cost to him, one (1) set of the Contract Drawings as hard copy prints and Contract Specifications as electronic file for use to generate copies of Construction Documents. This is in addition to the signed Contract Set(s) for building permit application. Additional sets, if requested by the Contractor, shall be furnished at the Architect's cost for reproduction."

Article 3 - Contractor

Add the following paragraph 3.2.4:

"Should any contradiction, ambiguity, error, inconsistency, omission or incomplete system appear in or between any of the Contract Documents, the Contractor shall, before submitting the final bid and signing the contract for construction, notify the Architect and request a written resolution as to which methods or materials will be required. In the event of conflicting requirements of standards, drawings or specifications, the Contractor shall comply with the more stringent requirements. Before submitting the final bid and signing the contract for construction the Contractor shall obtain an written interpretation from the Architect. In no case shall the Contractor proceed with the affected work until advised by the Architect.

If the Contractor fails to make a request for interpretation or resolution no excuse will be accepted for failure to carry out the work in a satisfactory manner, as interpreted by the Architect. This generally means the use of the highest quality material, most expensive way of performing work and providing complete functioning systems for proper operation,

Each and every trade or Subcontractor will be deemed to have familiarized themselves with all Contract Documents of this project, including Architectural, Structural, Mechanical, Electrical and Site Work, and to have visited the site, so as to avoid errors, omissions and misinterpretations. Related information may be provided on Contract Documents other than those associated with the Subcontractor's trade. The Contractor is responsible for coordinating related work of all the Contractor Documents. No additional compensation will be authorized for alleged errors, omissions and misinterpretations, whether they are a result of failure to observe this requirement or not."

Add a new paragraph 3.2.5 as follows:

"Contractor shall check, verify and be responsible for all dimensions whether existing prior to commencement of his work or created by his work."

Add the following to paragraph 3.5:

"Contractor shall warranty the project for a minimum of two years as required by Maine State Law."

Add at the end of paragraph 3.12.1 the following:

"The shop drawings shall include fabrication, erection layout and setting drawings and schedules; performance and test data; wiring and piping diagrams and any other information required for proper approval or installation of all parts of the work specified. If any modifications are required to a standard item, such modification shall be clearly shown or noted at the time of the submittal of shop drawings."

Add at the end of paragraph 3.12.4 the following:

"Submittals shall be required for all fabricated items proposed for use in the project as listed at the end of specification section 01300."

Add at the end of paragraph 3.18.1 the following:

"The Contractor's indemnification shall include without limiting the generalities of the foregoing, all claims, damages, losses and expenses arising out of the provisions of the Workmen's Compensation Laws in the state that the project is located."

Article 4 - Administration of the Contract

In paragraph 4.2.8 delete the following:

"Change Orders and...."

Article 5 - Subcontractors

No Change.

Article 6 - Construction by Owner or by Separate Contractors

Add at the end of paragraph 6.2.1 the following:

"The Contractor shall be responsible for and shall have the authority to coordinate the works of other contractors under separate contracts where the completeness of the project depends on such works of other contractors. In carrying out this responsibility the Contractor shall give written notice to other contractors in ample time as to the estimated time when his work will be ready to receive the works of other contractors. Such other contractors are expected to verify the accuracy of such estimated time from time to time and the Contractor shall cooperate in every way possible to insure smooth and timely coordination of works by various other contractors."

Article 7 - Change in the work.

Add to paragraph 7.1.1 the following:

All changes in the Work cannot be performed until an authorized Change Order has been issued. Any changes in the Work which are commenced prior to issuance of a Change Order may be subject to removal or will be done at the expense of the Contractor.

In paragraph 7.2.1 delete the following:

"Prepared by the Architect" and substitute "Prepared by the Contractor."

Delete subparagraph 7.3.3.1, in its entirety and substitute the following:

The cost or credit to the Owner resulting from a change in the work shall be determined by the actual direct costs or savings to the Contractor, plus, in the case of an increase in the Contract Sum, an allowance for overhead and profit as set forth below. Unless otherwise provided in the Contract Documents, 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; workmen's compensation insurance; bond premiums; rental value of equipment and machinery; and the additional costs of supervision personnel directly attributable to the change. The amount of credit to be allowed by the Contractor to the Owner for any deletion or change which results in a new decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Architect. When both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any with respect to that change. The total allowable cost for overhead and profit, shall be at the same percentage for overhead and profit as included in the base contract.

Article 8 - Time

Add at the end of paragraph 8.2.3 the following:

"Should the Contractor fail at any time to maintain satisfactory progress in accordance with the Progress Schedule required by Paragraph 3.10, the Contractor shall, upon written notice from the Owner, furnish additional labor and/or perform overtime work as and when necessary to progress the work on schedule. The Contractor shall be solely liable for increases in rates of wages for overtime work and any other increases in costs that may accrue as a result of failure to maintain satisfactory progress."

Add a new paragraph 8.2.4 as follows:

"The failure to complete the work within the Contract time together with the extension thereof, if any, shall constitute a breach of contract and subject to filing by the Owner of claims against the Contractor for recovery of liquidated damage if the Owner so chooses."

Article 9 - Payments and Completion

Add at the end of paragraph 9.8.4 the following:

"The Contractor shall obtain and furnish to the Owner a bona fide Certificate of Occupancy upon final completion."

Add a new subparagraph 9.9.4 as follows:

"The Owner reserves the right to receive, place and install equipment and furnishings prior to the date of substantial completion in such a manner that will not cause serious interference with the Contractor's work. Such preliminary occupancy shall not be construed as acceptance by Owner of any work. The Owner shall notify the Contractor, in writing, of intention to take such temporary occupancy not less than thirty (30) days before the desired date of occupancy and the Contractor shall in writing, confirm or request postponement of the date not later than five (5) days after the receipt of the notice."

Add at the end of paragraph 9.10.2 the following:

"Prior to final payment, Contractor's Affidavit of Payment of Debts and Claims and Affidavit of Release of Liens shall be submitted in the form of AIA Documents G706 and G706A."

Article 10 - Protection of Persons and Property.

No Change.

Article 11 - Insurance and Bonds

Add a new paragraph 11.1.4 as follows:

The following insurance and limits shall be required as minimum:

Commercial General Liability Insurance:

(Note: Lower Limits are acceptable in conjunction with an Umbrella Policy)

- | | |
|-------------------------|---|
| 1. COVERAGE BASIS: | Occurrence Policy |
| 2. LIMIT: | \$2,000,000 general aggregate
\$2,000,000 aggregate products/
completed operations
\$1,000,000 personal advertising
\$1,000,000 per occurrence
\$50,000 fire damage
\$5,000 medical expense |
| 3. INCLUDE: | - Completed operations/Product
Liability (including XCU
coverage if applicable)
- Blanket contractual liability
- Employees as additional insureds
- Premises Medical Payments |
| 4. DEDUCTIBLE: | None |
| 5. CONTINUOUS COVERAGE: | Contractor agrees to continue to
provide evidence for one year
following work acceptance that CGL
insurance has been continuously in
force. |

Workers Compensation:

- | | |
|-------------------------|---|
| 1. LIMITS: | Statutory |
| 2. EMPLOYER'S LIABILITY | \$500,000 each accident/\$500,000
disease policy limit.
Extending to cover all contracted
labor used on the project. |

Automobile Insurance:

- | | |
|------------|---|
| 1. FORM: | Comprehensive automobile liability covering "any auto" |
| 2. LIMITS: | \$1,000,000 bodily injury each person and property damaged
\$2,000,000 each accident |

Umbrella Insurance: (only required if primary Commercial General Liability or Automobile policies are less than the limits indicated)

Contractors Pollution Liability:(only applies to contractors involved in environmental or hazardous waste abatement projects and in the use of large quantities of hazardous materials)

- | | |
|----------------------|---|
| 1. FORM: | Claims made |
| 2. LIMIT: | Not less than \$1,000,000 or such additional coverage as may be required. |
| 3. DEDUCTIBLE: | No greater than \$25,000 |
| 4. DISCOVERY PERIOD: | 365 Days |

All Policies:

1. Must name the following as additional insureds (with the exception of Worker's Compensation and Professional Liability coverage)

The Owner of this project as indicated on the Contract for the project.

2. Other additional insured if required by the Owner or Mortgage:
3. Must contain 30-day written notice of cancellation to certificate holder's provision.
4. Must be placed with insurers carrying an A.M. Best of A or better.

Subcontractors:

Subcontractors must carry the same insurance and minimum limits as Contractor in or Contractor must insure activities of subcontractors in his own policy.

Owner's Protective Liability Insurance:

The Contractor shall include as an expense, during the life of this Contract, the deductible of the Owner's Protective Liability Insurance, for Bodily Injury Liability Insurance and for Property Damage Liability Insurance.

Article 12 - Uncovering and Correction of Work

In paragraph 12.2.1 delete the following:

"Or After Substantial Completion"

and substitute:

"Or After Final Completion and Acceptance by the Owner".

In paragraph 12.2.2.1 delete the following:

"...3.5, if, within one year after..."

and substitute:

"...3.5, if, within two years after...r".

Article 13 - Miscellaneous Provisions

No Change

Article 14 - Termination or Suspension of the Contract

No Change

Add Article 15 - Additional Provisions

15.1 Material and Substitution:

15.1.1 When a substitution of a material, system or method of construction proposed by the Contractor is duly approved, but such substitution requires modifications in the Contract Documents, whether relative to that item or to related work, the cost of making the modifications shall be borne by the Contractor.

15.1.2 If such substitution by the Contractor requires additional cost in the work of related trades, the Contractor shall bear such cost without penalizing the Owner in any way.

15.1.3. If such substitution requires additional architectural or engineering work, the Owner may request reimbursement for same from the Contractor.

END OF SGC

DIVISION I

General Requirements



SECTION 01010 - SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. The Owner is:
 - 1. The Village at Ocean Gate, LLC
 - 2. c/o Atlas Investment Group, LLC
 - 3. 35 Fay Street, Suite 107B
 - 4. Boston, MA 02118
- B. Section Includes:
 - 1. Project description.
 - 2. Applicable regulatory requirements.
 - 3. Access to the site and use of the premises.
 - 4. Site Conditions
 - 5. Preconstruction meeting.
 - 6. Security procedures.
 - 7. Building Air infiltration and Blower Door Testing.
 - 8. Coordination.

1.3 PROJECT DESCRIPTION

- A. The project consists of the construction of garages and retail space on lower level with residential buildings, associated plazas and site work above.
 - 1. Total number of units:
 - a. Building 1 = 40 Units.
 - b. Building 2 = 42 Units.
 - 2. At Middle Street, Portland, Maine.
 - 3. As shown in contract documents prepared by David M. White, Architect
 - a. Dated on the cover of these Contract Specifications and the cover of the Contract Drawings.

- B. The Project Construction
 - 1. Construction of:
 - a. First Floor of poured concrete and structural steel with steel and concrete deck.
 - b. Two 4 story residential buildings above to be constructed as wood framed buildings with open web trusses and conventional platform framing.
 - 2. Sprinkler, HVAC and electrical systems.
 - 3. Installation of new water lines, sanitary system and utilities as shown.
 - 4. Raised Plaza with pavers and planter beds over Garage Level between Building 1 and 2.

1.4 REGULATORY REQUIREMENTS

- A. The following currently enforced regulations are applicable to this project:
 - 1. The ME State Building Code.
 - 2. The ME State Plumbing Code
 - 3. The ME State Electrical Code
 - 4. The ME State Mechanical Code
 - 5. Federal Fair Housing Amendments
 - 8. ADAAG for areas open to the public.
- A. Other regulations may also be applicable.
- B. Obtain copies of the regulations listed above and keep at the project site for the use of all parties.
- C. Submit copies of all permits, licenses, and similar permissions obtained, and receipts for fees paid, to the Owner directly.

1.5 ACCESS TO THE SITE AND USE OF THE PREMISES

- A. The space available to the contractor for the performance of the work, either exclusively or in conjunction with others performing other construction as part of the project, is shown on the drawings.
 - 1. Other areas are off limits to all construction personnel.
- B. Limited storage areas will be available on site.
- C. Signs: Provide signs adequate to direct visitors.
 - 1. Do not install, or allow to be installed, signs other than specified sign(s) and signs identifying the principal entities involved in the project.

1.6 SITE CONDITIONS

- A. If the Geotechnical Report is not bound in this specification a copy is available from the Owner or Architect for review by the contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. A preconstruction meeting will be held at a time and place designated by the Owner, for the purpose of identifying responsibilities of the owner's and the architect's personnel and explanation of administrative procedures.
- B. The contractor shall also use this meeting for the following minimum agenda:
 - 1. Construction schedule.
 - 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. Attendees shall include:
 - 1. The owner.
 - 2. The architect, and any consultants.
 - 3. The contractor and its superintendent.
 - 4. Others interested in the work.

3.2 SECURITY PROCEDURES

- A. Limit access to the site to persons involved in the work.
- B. Provide secure storage for materials for which the Owner has made payment and which are stored on site.
- C. Secure completed work as required to prevent loss.

3.3 BUILDING AIR INFILTRATION AND BLOWER DOOR TESTING

A. Building Air Infiltration :

1. All components and systems are to be installed and constructed to prevent air infiltration through assemblies and around penetrations.
 - a. Manufacturer's installation instructions shall be strictly adhered to, where air infiltration is affected.
 - b. The annular space of all penetrations shall be sealed using fire stopping where it is already required or caulking and foam sealant where a fire rating issue is not present.
2. At key stages of building construction an energy consultant and/or testing agent shall inspect the construction. The stages of construction for inspection shall be as follows. Additional inspections may be required as needed:
 - a. Completion of framing and windows installation.
 - b. Completion of rough-in installations.
 - c. Completion of insulation installation.
 - d. Completion of drywall and finish carpentry.
 - e. Completion of exterior siding and all exterior wall penetrations.
3. Items indicated to be addressed shall be addressed to the satisfaction of the energy consultant or testing agent prior to installation of the next stage of construction.
4. The costs of energy consultant inspection services shall be at the Owner's expense.

B. Blower Door Testing:

1. At the completion of the project a full building Blower Door Test and individual unit Blower Door Tests shall be conducted following ASTM E1827-96 (2002) or ASTM E779 as determined by the testing agency.
2. The General Contractor shall assist in this testing by providing personnel to set systems and components as needed to conduct the testing.
3. The costs of standard Blower Door Testing services shall be at the Owner's expense.
4. The General Contractor prior to signing the contract for construction shall specifically agree to meet the following air infiltration performance values for the entire building and for each unit.
 - a. Air Infiltration Through Building Shell: .15 ACH or less.
 - b. Total Building Air Infiltration:
Building 1 : 1843 CFM or less
Building 2 : 1983 CFM or less
 - c. Effective Leakage Area per 100 Square Feet of Building Shell:
2 SF or less.

5. The General Contractor shall agree to assist in determining the deficiency in the building that is causing the building to fail to meet the performance standards stated here. If significant additional testing is needed to determine the deficiency, the cost at that testing shall be reimbursed to the Owner by the General Contractor.
6. The General Contractor shall agree to address and correct the deficiency as determined through collective review with the energy consultant or testing agent.

3.4 COORDINATION

- A. If necessary, inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings.
 1. Inform the owner when coordination of his work is required.
- B. See other requirements in other portions of the contract documents.
- C. Conduct meetings for the specific purpose of coordination, at least once a month.
 1. Attendees shall include:
 - a. Contractor.
 - b. Subcontractors currently working at the site.
 - c. Subcontractors or suppliers who are currently having work fabricated offsite.
 - d. Representative from the Owner.
- D. Prepare coordination drawings where limited space available may cause conflicts in the locations of installed products, and where required to coordinate installation of products.
 1. Where space is limited, show plan and cross-section dimensions of space available, including structural obstructions and ceilings as applicable.
 2. Coordinate shop drawings prepared by separate entities.
 3. Show installation sequence when necessary for proper installation.

END OF SECTION 01010

DAVID M. WHITE, ARCHITECT

403 tibbetts hill rd.
p.o. box 447
goffstown, n.h. 03045
603-497-3405
fax 603-497-2783

MEMO

Date: July 1, 2008

From: David White

To: Barbara Barhydt

Project: The Village at Ocean Gate

Copy To: The Village at Ocean Gate,

Number: 02

LLC

Reference: Exterior materials

The following is a list of materials selected for the exterior of the building. The submitted elevations identify three color schemes. These color schemes are an important means of creating the diversity in the building massing, so although your purview is usually in assuring quality material selections, we believe this coloration should be included for the overall design intent of the project.

Most of the materials selected have representative samples in your office which can be presented to the Planning Board at the workshop.

1. The brick selected is as indicated herein and by the submitted samples.
2. The belt course and cap stones are precast concrete in a sandstone appearance.
3. The foundation base is Shouldice Textured Stone in Tex-Stone Antique Bronze to simulated granite facing.
4. The material for the siding at the balconies, fourth floor, and parapet and the elevator penthouse is Hardie panel (fiber cement board) with battens at 16" O.C.
5. The material for the clapboard siding is Hardie plank clapboards (fiber cement board), 6" exposure.
6. The windows, except at the storefront and the deck doors and patio doors are manufactured by Eagle Window and Door Company or equal.

7. The storefront framing is manufactured by Kawneer or equal. Color to be Hartford Green. Color at the main residential entrances to be Medium Bronze.
8. The Newbury Street entrance to be hollow metal frames and doors by Ceco or equal, painted a chocolate brown.
9. The balcony railings are manufactured by Superior Aluminum Corp. or equal. Color to match adjacent siding color.
10. The overhead doors are manufactured by Overhead Door Corporation or equal. Doors to be painted to match Shouldice Antique Bronze
11. Service doors are manufactured by Ceco or equal and will be painted to match the window color of the clapboard field above.
12. Louvers for the carbon monoxide exhaust system (this includes intake and exhaust) will be galvanized metal to be painted to match the field color in which they are located.
13. Grilles for the HVAC units are made by the HVAC manufacturer and will be painted to match the field in which they are located.
14. Exhaust vents for bath, kitchen and dryer fans to be painted to match the brick or siding material.

The following are the selected colors for the three selected color schemes:

Color Scheme A:

Red Brick – Old Port Red Range I

or

Hardie Clapboards: Color Plus Countrylane Red

Window lintels: Sandstone colored precast concrete

Window sills: Red Brick

Windows in the brick or clapboard field: Eagle Mallard Green

Trim and window trim in the clapboard field: Color Plus Alpine Frost

Hardie Panel at decks and top floor: Color Plus Light Mist

Window trim in the panel field: Color Plus Light Mist

Windows in the Hardie panel field: Eagle Harbor Mist or Colony White.

Color Scheme B:

Brown Brick – Woodland Brown Brushed Velour

Window lintels: Sandstone colored precast concrete

Window sills: Brown brick

Windows in all fields: Eagle Tan

Hardie Panel at decks and top floor: Color Plus Khaki Brown

Window trim in the Hardie panel field: Color Plus Khaki Brown

Color Scheme C:

Hardie Clapboards: Color Plus Harris Cream

Windows in the clapboard field: Eagle Butterscotch.

Windows in the panel field: Eagle Antique White

Trim and window trim in the clapboard field: Color Plus Navajo Beige

Hardie Panel at balconies and top floor: Color Plus Autumn Tan

Window trim in the Hardie panel field: Color Plus Autumn Tan

Storefronts:

Awnings: Colors to be selected by tenants and submitted to staff for approval. In general, colors shall match or shall be compatible with storefront color selections.

SECTION 01025 - PAYMENT, MODIFICATION, AND COMPLETION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Schedule of values.
 - 2. Payment procedures.
 - 3. Modification procedures.
 - 4. Completion procedures.
- B. Related Requirements Specified Elsewhere in the Project Manual:
 - 1. Time limit for submittal of schedule of values.
 - 2. Retainage.

1.3 CONTRACT CONDITIONS

- A. See the conditions of the contract for additional requirements.
- B. The architect will act upon the contractor's application for payment within 7 days after receipt.
- C. The owner shall make payment to the contractor within 30 days or subsequent to the Department of Housing and Urban Development processing of the Contractor's Requisition and issuing payment.
- D. No payment will be made for materials or equipment stored off site.
- E. Payments may be withheld if the contractor fails to make dated submittals within the time periods specified.

1.4 DEFINITIONS

- A. Change Proposal Request: Any written request from the owner or architect to the contractor for a quotation, price, or breakdown on a change proposed but not ordered.

- B. Final Completion: The stage at which all incomplete and incorrect work has been completed or corrected in accordance with the contract documents.
- C. List of Incomplete Work: A comprehensive list of items to be completed or corrected, prepared by the contractor for the purpose of obtaining certification of substantial completion. This list is also referred to as a "punchlist."
- D. Modifications: Written amendments to the contract signed by both the owner and the contractor, change orders, construction change directives, and written orders for a minor change in the work issued by the architect.
- E. Schedule of Values: A detailed breakdown of the contract sum into individual cost items, which will serve as the basis for evaluation of applications for progress payments during construction.
- F. Substantial Completion: The time at which the work, or a portion of the work which the owner agrees to accept separately, is sufficiently complete in accordance with the contract documents so that the owner can occupy or use the work for its intended purpose.
- G. Time and Material Work: Work which will be paid for on the basis of the actual cost of the work, including materials, labor, equipment, and other costs as defined elsewhere, as documented by detailed records. This basis is also referred to using the terms "cost-plus," "cost of the work," "force account," and similar terms.

1.5 SUBMITTALS

- A. Schedule of Values: First application for payment will not be reviewed without schedule of values.
 - 1. Submit in size not larger than 8-1/2 by 11 inches.
 - 2. Submit 11 copies.
 - 3. Identify with:
 - a. Project name.
 - b. Project number.
 - c. Architect's name.
 - d. Owner's name.
 - e. Contractor's name and address.
 - f. Submittal date.

- B. Applications for Progress Payments: Submit sufficiently in advance of date established for the progress payment to allow for the processing indicated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF VALUES

- A. Prepare a schedule of values prior to the first application for payment.
- B. Schedule of Values: Break costs down into line items which will be comparable with line items in applications for payment.
 - 1. Coordinate line items in the schedule of values with portions of the contract documents which identify units or subdivisions of work; provide cross-referencing if necessary to clarify.
 - a. Specifically, correlate with the project manual table of contents.
 - 2. Divide major subcontracts into individual cost items.
 - 3. Where applications for payment are likely to include products purchased or fabricated but not yet installed, provide individual line items for material cost, installation cost, and other applicable phases of completion.
 - 4. The General Conditions line item shall be a percentage of General Conditions equal to the percentage of the total project completion.
 - 5. Show overhead and profit separately only if those items will be listed separately in applications for payment.
 - a. Major items which are not direct costs of putting the work into place, such as temporary facilities, may either be listed as individual line items or proportioned among direct cost items.
 - 6. Change Orders are to be listed in a separate schedule of values.
 - 7. Include the following information for each line item
 - a. Item name.
 - b. Applicable specification section.
 - c. Dollar value, rounded off to the nearest whole dollar (with the total equal to the contract sum).
 - d. Proportion of the contract sum represented by this item, to the nearest one-hundredth percent (with the total adjusted to 100 percent).
 - 8. Provide the following supporting data for each line item:
 - a. Subcontractor's name.
 - b. Manufacturer or fabricator's name.
 - c. Supplier's name.

- C. The architect will notify the contractor if schedule is not satisfactory; revise and resubmit acceptable schedule.
- D. Submit a revised schedule of values when modifications change the contract sum or change individual line items.
 - 1. Make each modification a new line item.
 - 2. Show the following information for each line item:
 - a. All information required for original submittal.
 - b. Identification of modifications which have affected its value.
 - 3. Submit prior to next application for payment.

3.2 APPLICATIONS FOR PAYMENT

- A. Application for Payment Forms: AIA Certificate for Payment G702
- B. Preparation of Applications for Payment: Complete form entirely.
 - 1. Make current application consistent with previous applications, certificates for payment, and payments made.
 - 2. Base application on current schedule of values and contractor's construction schedule.
 - 3. Include amounts of modifications issued before the end of the construction period covered by the application.
 - 4. Include signature by person authorized by the contractor to sign legal documents.
 - 5. Notarize each copy.
 - 6. Submit in 11 copies.
 - 7. Attach waivers of lien.
 - 8. Attach Affidavit for Construction Loan Draw.
 - 9. Attach revised schedule of values, if changes have occurred, unless application forms already show entire schedule of values.
 - 10. Also attach:
 - a. Updated schedule
 - b. Invoices for on-site stored material.
- C. Provide the following information with every application for payment which involves work completed on a time and material basis:
 - 1. Detailed records of work done, including:
 - a. Dates and times work was performed, and by whom.
 - b. Time records and wage rates paid.
 - c. Invoices and receipts for products.
 - 2. Provide similar detailed records for subcontracts.
- D. Transmit application for payment with a transmittal form itemizing supporting documents attached.
 - 1. Transmit to the architect.

3.3 WAIVERS OF LIEN

- A. Submit, with each application for payment, waivers of lien from every entity who performed work during the period covered by the previous application for payment, and who may be legally entitled to file a mechanic's or other lien against the work.
- B. Waiver of Lien Forms: Use forms acceptable to the owner.

3.4 FIRST PAYMENT PROCEDURE

- A. The first application for payment will not be reviewed until the following submittals have been received:
 - 1. Certificates of insurance.
 - 2. Performance and payment bonds.
 - 3. Schedule of values.
 - 4. List of subcontractors, principal suppliers, and fabricators.
 - 5. Contractor's construction schedule.
 - 6. Submittal schedule.
 - 7. Copies of building permit and other authorizations from governing authorities.
 - 8. All submittals specified to occur prior to first application for payment or prior to first payment.

3.5 MODIFICATION PROCEDURES

- A. Designate a single individual authorized to receive change documents and who will be responsible for informing others of changes to the work.
- B. Changes in cost resulting from modifications shall include only those costs specified elsewhere in the contract documents.
- C. When requested in writing, the contractor shall provide sufficient information for evaluation of proposed changes within 14 days
- D. Provide the following information for every change proposal request:
 - 1. The amount of change in the contract sum, if any.
 - 2. The amount of change in the contract time, if any, with explanation.
 - 3. Cost breakdown, using schedule of values line items, separated into material and labor costs, additions and deletions, and with overhead and profit handled in the same manner as specified for the schedule of values.
 - 4. The period of time within which the proposed changes in contract sum or time will be valid.

5. A statement describing the effect the change may have on the work of other prime contractors.
6. Upon request, provide the following information:
 - a. Quantities and unit costs of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
- E. When changes are performed on a time and material basis, identify the applicable modification on the application for payment.
- F. Provide the following information with every claim for additional costs:
 1. Origin and date of claim.
 2. Detailed records as specified for time and material work.
 3. Separate accounting of all general requirement costs.
- G. The contractor may propose changes.
 1. Do not use change order form.
 2. Provide the information required for change proposal requests.
 3. Describe reasons for change.
 4. Document proposed substitutions as specified elsewhere.

3.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Request for inspection and application for payment may coincide.
- B. The architect will perform inspection for substantial completion, upon request of the contractor.
 1. Only one certificate of substantial completion will be issued for each building permit issued.
 2. Contractor to provide there one punchlist prior to Architect's inspection.
- C. Submit the following with application for payment following substantial completion:
 1. Contractor's affidavit of release of liens.
 2. Meter readings of all utilities services for which the contractor has been paying.
 3. Request for reduction or release of retainage.
 4. Consent of surety to reduction in or partial release of retainage.
 5. Final list of incomplete work.
 6. Other data required by the contract documents.

3.7 FINAL COMPLETION PROCEDURES

- A. Request for final inspection and final application for payment may coincide.
- B. The architect will perform inspection for final completion, upon request of the contractor.
 - 1. Submit the following with request for inspection:
 - a. Previous inspection lists indicating completion of all items.
 - b. If any items cannot be completed, obtain prior approval of such delay.
- C. Submit the following with the final application for payment:
 - 1. Certified copy of the previous list of items to be completed or corrected, stating that each has been completed or otherwise resolved for acceptance.
 - 2. Updated final statement, accounting for final changes to the contract sum.
 - 3. Consent of surety to final payment.
 - 4. Final liquidated damages statement.
 - 5. Meter readings of all utilities services for which the contractor has been paying after substantial completion.
 - 6. Certification that financial obligations to governing authorities and public utilities have been fulfilled.
 - 7. Description of unsettled claims.
 - 8. Other data required by the contract documents.

END OF SECTION 01025

SECTION 01200 - PROGRESS DOCUMENTATION AND PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Progress documentation requirements:
 - a. Contractor's construction schedule.
 - b. Progress reports.
 - 2. Progress procedures:
 - a. Progress meetings.
- B. Contract time is indicated elsewhere.
- C. Related Sections:
 - 1. Applications for payment: Elsewhere in Division 1.
 - 2. Schedule of values: Elsewhere in Division 1.
 - 3. Submittal schedule: Elsewhere in Division 1.
 - 4. Quality control activities schedule: Elsewhere in Division 1.

1.3 SUBMITTALS

- A. Contractor's Construction Schedule.
 - 1. Submit within 30 days after date established for the start of work.
 - 2. Submit revised schedule with application for payment.
- B. Progress Reports: Submit with each application for payment.
- C. Minutes of Progress Meetings.

1.4 FORM OF SUBMITTALS

- A. Schedules - General:
 - 1. Provide legend of symbols and abbreviations for each schedule.
 - 2. Use the same terminology as that used in the contract documents.
 - 3. When transparencies are submitted, use only media which will not fade or lose contrast over time.
 - 4. When opaque copies are submitted, submit a minimum of 3 copies.

- B. Bar Charts:
1. Provide individual horizontal bars representing the duration of each major activity.
 2. Coordinate each element on the schedule with other construction activities.
 3. Show activities in proper sequence.
 4. Show percentage of completion of each activity.
 5. Include cost bar at top of chart, showing estimated and actual costs of work performed at the date of each application for payment.
 6. Use vertical lines to mark the time scale at not more than one week intervals.
 7. Prepare on reproducible transparency.
 8. Use sheets of sufficient number and width to show the full schedule clearly.
- C. Reports - General:
1. Submit a minimum of 3 copies.

1.1 COORDINATION

- A. In preparation of schedules, take into account the time allowed or required for the architect's administrative procedures.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Prepare and submit a construction schedule.
- B. Provide construction schedule in the form of bar charts:
1. Use the same items of work as shown in the schedule of values.
 2. Where related activities must be performed in sequence, show relationship graphically.
 3. Coordinate with the submittal schedule specified elsewhere.
 4. Coordinate with the quality control activities schedule specified elsewhere.
 5. Show dates of:
 - a. Each activity that influences the construction time.
 - b. Preconstruction meeting.
 - c. All submittals required.
 1. Submittal dates may be provided in a separate list rather than on the schedule.
 - d. Completion of structure.

- e. Completion of permanent enclosure.
 - f. Substantial and final completion, with time frames for the architect's completion procedures.
 - g. Show dates required for:
 - (a) Delivery of owner-furnished products.
6. In developing the schedule take into account:
- a. Weather, including seasonal changes.
 - b. Need for temporary heating, ventilating, or air-conditioning.
- C. The architect will notify the contractor if schedule is not satisfactory; revise and resubmit.
- 1. Resubmit within 7 days.
- D. Make and distribute copies of schedule to the architect, to the owner, to subcontractors, and to other entities whose work will be influenced by schedule dates.
- 1. Hang a copy of the schedule up in each field office or meeting room.
- E. Update the schedule whenever changes occur or are made, or when new information is received, but not less often than at the same intervals at which applications for payment are made.
- 1. Indicate changes made since last issue; show actual dates for activities completed.
 - 2. Submit updated schedule with application for payment.
 - 3. Issue updated schedule with report of meeting at which revisions are made.
 - 4. Issue updated schedule in same manner as original schedule.

3.2 PROGRESS REPORTS

- A. Progress Reports: Prepare a narrative report describing the general state of completion of the work and describing in detail the following:
- 1. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.
 - 2. Actual and potential problems.
 - 3. Status of change order work.
 - 4. Effect of delays, problems, and changes on the schedules of other prime contractors.
 - 5. Outstanding change proposal requests.
 - 6. Status of corrective work ordered by the architect.

3.3 PROGRESS MEETINGS

- A. Schedule and conduct periodic progress meetings during construction period.
 - 1. Have meetings once a month at the same time as application for payment.
 - 2. Notify the architect and the owner at least one week in advance of date of meeting; the architect and the owner may attend.

- B. The following are required to attend:
 - 1. Project superintendent.
 - 2. Major subcontractors and suppliers.
 - 3. Others who have an interest in the agenda.
 - 4. Owner's Representative.
 - 5. The Architect.

- C. Prepare and distribute agenda prior to meetings; cover the following topics when applicable:
 - 1. Review minutes of previous meeting.
 - 2. Status of submittals and impending submittals.
 - 3. Actual progress of activities in relation to the schedule.
 - 4. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.
 - 5. Actual and potential problems.
 - 6. Status of change order work.
 - 7. Effect of proposed changes on schedule and coordination.
 - 8. Status of corrective work ordered by the architect.
 - 9. Progress expected to be made during the next period.
 - 10. Status of inspections.
 - 11. Clarifications and interpretations.

- D. Record minutes and distribute copies within 5 days. to the architect, to the owner, to all participants, and to all entities affected by decisions made.

END OF SECTION 01200

SECTION 01210 - ALLOWANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
 - 1. Certain materials and equipment are specified in the Contract Documents by allowances. The intent of this allowance is to cover the work associated with the items listed. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
- C. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 SELECTION AND PURCHASE

- A. When conflicts are discovered, obtain proposals for each allowance for use in making final decisions. Include recommendations that are relevant to performing the Work.

1.4 SUBMITTALS

- A. Submit proposals for work included in allowances, in the form specified for Change Orders.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine area covered by an allowance for conditions related to each allowance. Review with architect.

3.2 PREPARATION

- A. Coordinate allowance materials with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Include in the Contract for the project an allowance to cover the furnishing and installation of upgraded finishes in the common areas. These shall include, but not be limited to Corridors, Lobbies, Elevator Lobbies, Vestibules and Elevator Cab interiors.
 - 1. Amount: \$30,000
- B. Allowance No. 2: Include in the Contract for the project an allowance to cover the furnishing and installation of awnings at the locations shown on the exterior building elevations.
 - 1. Amount: \$16,000
- C. Allowance No. 3: Include in the Contract for the project an allowance to cover the furnishing and installation of storage bins as laid out on the floor plans. These shall include a cage type enclosure with a lockable door. At the locations designated provide Canoe/Kayak storage racks to provide stacked storage. All materials shall be noncombustible in compliance with Type I construction required for the First Floor.
 - 1. Amount: \$30,000

END OF SECTION 01210

SECTION 01250 – DOUGHNUTS AND COFFEE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Doughnuts and pastries.
 - 2. Beverages.
- B. Related Sections:
 - 1. Progress documentation and procedures: Elsewhere in Division 1.
- C. Negotiations:
 - 1. This is a non negotiable item. In no way can it be deleted from the contract or altered in any way. When contractor signs this contract with the Owner he is bound by the terms of this Section.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, installation instructions, and general recommendations. Include data substantiating that products to be furnished comply with requirements of the contract documents.
- B. Contractor shall submit full range of samples to the Architect, prior to construction start up, for product approval as a better quality substitute.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain required products from a single manufacturer. Firm with not less than 5 years of successful baking experience.
 - 2. Baked goods shall be fresh and baked no longer that 4 hours prior to installation.
 - 2. Maintain throughout duration of the work a crew who are fully qualified to satisfy requirements of the specifications.

3. Accessories: Provide accessory products only as produced or recommended by manufacturer of primary products.

1.5 WARRANTY

- A. Special Project Warranty: Submit a written warranty signed by the manufacturer and the contractor guaranteeing to correct failures in materials and workmanship which occur within the warranty period, including those attributable to abnormal aging, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents.
 3. The warranty shall include responsibility for obtaining and replacing products as necessary to restore satisfaction to the slob stuffing their face.
 4. Warranty period: 24 hours after time of installation.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original containers bearing manufacturer's name, contents, nutritional data, date of expiration, and installation instructions.
- B. Storage:
 1. Store bakery materials in a dry place and weathertight container.
 2. Maintain 40 degrees F for beverages Do not allow materials to freeze.
 3. Maintain secure containment of products to prevent vandalism or stealing of products.

1.7 PROJECT CONDITIONS

- A. Provide products only under the following environmental conditions:
 1. All air borne contaminants are removed from area.

1.8 COORDINATION

- A. General: Time delivery of baked goods for freshness and beverages for proper installation temperature.

PART 2 - PRODUCTS

- 2.1 BAKED GOODS: Products noted here are only considered as a basis of design. Products of Krispy Kreme and Mike's Donuts shall be submitted for all attendees to sample and then vote on which manufacturer shall be supplied for the duration of the project. Products of local bakeries shall be submitted for approval also. The contractor shall seek out these bakeries and provide products from these local manufacturers. (Architect's are well aware that the Contractor's have specially trained noses for finding excellent bakeries and dinners.) Products larger than specified or of more variety shall be provided.
- A. The design is based on the following product: "Dunkin Donuts", Raised Donuts.
 - 1. Materials: Raised Dough.
 - 2. Diameter: 4" or greater.
 - 3. Minimum of 6 Honey Dip per dozen container.
 - B. The design is based on the following product: "Dunkin Donuts", Cake Donuts.
 - 1. Materials: Cake Dough.
 - 2. Diameter: 3" or greater.
 - 3. Minimum of 2 doughnut of Owner's preference.
 - C. The design is based on the following product: "Dunkin Donuts", Coffee Rolls.
 - 1. Materials: Raised Dough.
 - 2. Diameter: 5" or greater.
 - 3. Core: Cinnamon Sugar in spirals
 - 4. Minimum of 2 per delivery.
 - D. The design is based on the following product: "Dunkin Donuts", Pastries.
 - 1. Materials: Flakey Dough.
 - 2. Diameter: 4 1/2" or greater
 - 3. Minimum of 3 different flavors per delivery. At least one cheese flavored.

2.2 Fruit: Contractor shall keep abreast of seasonal availability of all commonly available fruits. Contractor shall seek out local produce stands for high quality fruits as a better substitute for products listed here. The following is to be considered a basis of design.

- A. The design is based on the following product: Local Groceries Store Produce Department.
 - 1. Ripe with excellent color.
 - 2. Juicy and succulent.

2.3 BEVERAGES: Products noted are a basis of design. Products of better quality shall be provided where possible. Owner shall be the final judge of a products quality when submitted. Prior to first meeting contractor shall obtain beverage preferences of all attendees and provide such.

- B. The design is based on the following product: "Dunkin Donuts", Black Coffee.
 - 1. Materials: Dry Roasted Coffee.
 - 2. Minimum size: 1 large per serving.
 - 3. Thinner: Cream where required.
 - 4. Texturizer: Sugar where required.

- B. The design is based on the following product: "Garelick Farms", Whole Milk.
 - 1. Materials: Dairy Milk.
 - 2. Minimum size: 1 pint per serving.

- C. The design is based on the following product: "Tropicana", Juice.
 - 1. Materials: Orange Juice, substitution of other flavors may be submitted for approval.
 - 2. Minimum size: 1 pint per serving.

- D. A beverage of the agents preference shall be provided to any government agent in attendance of the meeting. The beverage shall be provided prior to any meeting business.

2.3 ACCESSORIES

- A. Napkins, stirrers, cups as necessary to properly install products.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect conditions under which the work of this section will be performed, and verify that surfaces are clean and properly prepared for the work of this section. Do not proceed with the work until unsatisfactory conditions have been fully resolved.

3.2 SEQUENCING

- A. Prior to first Progress Meeting obtain from attendees preferred baked goods and preferred beverages as specified.
- B. Preferred products shall be delivered to the site immediately prior to all Progress Meetings, Substantial Completion Inspection, Substantial Completion Meeting, Closeout Meeting, Nine Month Inspection and Twelve Month Inspection.

3.3 INSTALLATION

- A. General: Comply with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
- B. Tolerances: Install products of this section to within the following tolerances:
 - 1. Doughnuts shall not vary in size more than 1/4" from average size.
 - 2. Pastries shall not vary in size more than 1/2" from average size.
 - 3. Fillings may not vary more than .25 oz. from average.
 - 4. Coverings shall full cover baked good. No holidays permitted.
 - 5. Beverages as measured shall meet weights and measures of authority having jurisdiction over location of project.

3.4 CLEANING

- A. Following the work, remove from project site all discarded materials, rubbish, and debris resulting from the work.

END OF SECTION

SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Preparing and processing of submittals for review and action.
 - 2. Preparing and processing of informational submittals.
- B. Submit the following for the architect's review and action:
 - 1. Shop drawings.
 - 2. Product data.
 - 3. Samples.
 - 4. Refer to individual Sections of the Specification for specific items required for the submission of submittals.
 - 5. Refer to the end of the section for a list of submittals
- C. Submit the following as informational submittals:
 - 1. Structural design information required by the contract documents.
 - 2. Certificates.
 - 3. Coordination drawings.
 - 4. Reports.
 - 5. Qualification statements for manufacturers/installers.
 - 6. Coordination Drawings.
 - 7. Qualification/Experience Statements for installers and manufacturers.
 - 8. Field Samples which are to be kept for future evaluation in case of failure.
 - 9. Test reports.
 - 10. Inspection reports.
 - 11. Certificates.
 - 12. Submittals for which procedures are not defined elsewhere.
- D. Specific submittals are described in individual sections.
- E. Do not commence work which requires review of any submittals until receipt of returned submittals with an acceptable action.

- F. Do not allow submittals without an acceptable action marking to be used for the project.
- G. Submit all submittals to the architect.
- H. Do not submit substitute items that have not been approved by means of the procedure specified elsewhere.
- I. Do not include requests for substitution (either direct or indirect) on submittals; comply with procedures for substitutions specified elsewhere.
- J. Related Sections: The following are specified elsewhere in Division 1:
 - 1. Quality control submittals:
 - a. Inspection reports.
 - b. Test reports.
 - 2. Product submittals:
 - a. Product option submittals.
 - b. Requests for substitution.
 - c. Operating and maintenance data.
 - d. Warranties.
 - e. Maintenance materials and tools.
 - 3. Contract closeout submittals:
 - a. Equipment and systems demonstration reports.
 - b. Certificate of occupancy.
 - c. Project record documents.
 - 4. Other administrative submittals:
 - a. Layout data.

1.3 DEFINITIONS

- A. Shop Drawings: See General Conditions.
 - 1. Shop drawings also include:
 - a. Product data specifically prepared for this project.
- B. Product Data: See General Conditions.
 - 1. Product data submittals also include:
 - a. Selection data showing standard colors.
- C. Samples: See General Conditions.
- D. Informational Submittals: Submittals identified in the contract documents as to be submitted for information only.

1.4 FORM OF SUBMITTALS

- A. Large Sheets or Pages:
 - 1. Sheet size: 24 by 36 inches, maximum for drawings.
 - a. Exception: Full size pattern or template drawings.
 - 2. Number of copies:
 - a. Submittals for review:
 - (1) 1 copy or, if submittal requires engineer's review, 2 copies of blue- or black-line prints, plus quantity required by the Contractor and Owners final submittal set.
 - (2) All but 1 copy for architectural review, 2 copies for engineer's review will be returned.
 - b. Informational submittals:
 - (1) 2 copies of opaque prints.
 - (2) No copies will be returned.
- B. Small Sheets or Pages:
 - 1. Maximum sheet size: 8-1/2 by 11 inches.
 - 2. Maximum sheet size for opaque copies: 8-1/2 by 11 inches.
 - 3. Number of copies:
 - a. Opaque copies:
 - (1) For review: 1 copy or, if engineer's review is required, 2 copies plus quantity required by the Contractor and Owners final submittal set.
 - (2) All but 1 copy for architectural review, 2 copies for engineer's review will be returned.
 - 4. Informational submittals: 2 copies. No copies will be returned.
- C. Samples: 3 sets of each.
 - 1. 2 sets will be returned.
- D. If additional sets are needed by other entities involved in work represented by the samples, submit with original submittal.
- E. Copies in excess of the number requested will not be returned.
- F. Provide additional copies, if required for operating and maintenance data, marked to indicate their purpose.
- G. Provide additional copies for project record documents.

1.5 COORDINATION OF SUBMITTALS

- A. Coordinate submittals and activities that must be performed in sequence, so that the architect has enough information to properly review the submittals.
- B. Coordinate submittals of different types for the same product or system so that the architect has enough information to properly review each submittal.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TIMING OF SUBMITTALS

- A. Transmit each submittal at or before the time indicated on the approved schedule of submittals.
 - 1. Prepare and submit for approval a schedule showing the required dates of submittal of all submittals.
 - 2. Organize the schedule by the applicable specification section number.
 - 3. Incorporate the contractor's construction schedule specified elsewhere.
 - 4. Submit within 30 days after commencement of the work.
 - 5. Revise and resubmit the schedule for approval when requested.
- B. Deliver each submittal requiring approval in time to allow for adequate review and processing time, including resubmittals if necessary; failure of the contractor in this respect will not be considered as grounds for an extension of the contract time.
- C. Deliver each informational submittal prior to start of the work involved, unless the submittal is of a type which cannot be prepared until after completion of the work; submit promptly.
- D. If a submittal must be processed within a certain time in order to maintain the progress of the work, state so clearly on the submittal.
- E. Allow a minimum of 2 weeks, (plus one additional week if the review requires the review of the reviewer's engineer) for the first processing of each submittal. Allow more time when submittals must be coordinated with later submittals.

- F. Allow a minimum of 1 week, (plus one additional week if the review requires the review of the architect's engineer) for processing of resubmittals.
- G. If a submittal must be delayed for coordination with other submittals not yet submitted, the architect may at his option either return the submittal with no action or notify the contractor of the other submittals which must be received before the submittal can be reviewed.

3.2 SUBMITTAL PROCEDURES - GENERAL

- A. Contractor Review: Sign each copy of each submittal certifying compliance with the requirements of the contract documents.
- B. Notify the architect, in writing and at time of submittal, of all points upon which the submittal does not conform to the requirements of the contract documents, if any.
- C. Preparation of Submittals:
 - 1. Label each copy of each submittal, with the following information:
 - a. Project name.
 - b. Date of submittal.
 - c. Contractor's name and address.
 - d. Architect's name and address.
 - e. Subcontractor's name and address.
 - f. Supplier's name and address.
 - g. Manufacturer's name.
 - h. Specification section where the submittal is specified.
 - i. Numbers of applicable drawings and details.
 - j. Other necessary identifying information.
 - 2. Pack submittals suitably for shipment.
 - 3. Submittals to receive architect's action marking: Provide blank space on the label or on the submittal itself for action marking; minimum 4 inches wide by 5 inches high.

- D. Transmittal of Submittals:
1. Submittals will be accepted from the contractor only. Submittals received from other entities will be returned without review or action.
 2. Submittals received without a transmittal form will be returned without review or action.
 - a. Project name.
 - b. Submittal date.
 - c. Transmittal number.
 - d. Specification section number.
 - e. To:
 - f. From:
 - g. Contractor's name.
 - h. Subcontractor's and supplier's names.
 - i. Manufacturer's name.
 - j. Submittal type (shop drawing, product data, sample, informational submittal).
 - k. Description of submittal.
 - l. Action marking.
 - m. Comments.
 3. Fill out a separate transmittal form for each submittal; also include the following:
 - a. Other relevant information.
 - b. Requests for additional information.

3.3 SHOP DRAWINGS

- A. Content: Include the following information:
1. Dimensions, at accurate scale.
 2. All field measurements that have been taken, at accurate scale.
 3. Names of specific products and materials used.
 4. Show compliance with the specific standards referenced.
 5. Coordination requirements; show relationship to adjacent or critical work.
 6. Name of preparing firm.
- B. Preparation:
1. Reproductions of contract documents are not acceptable as shop drawings.
 2. Identify as indicated for all submittals.
 3. Space for architect's action marking shall be adjacent to the title block.

3.4 PRODUCT DATA

- A. When product data submittals are prepared specifically for this project (in the absence of standard printed information) submit such information as shop drawings and not as product data submittals.
- B. Content:
 - 1. Submit manufacturer's standard printed data sheets.
 - 2. Identify the particular product being submitted; submit only pertinent pages.
 - 3. Show compliance with properties specified.
 - 4. Identify which options and accessories are applicable.
 - 5. Include recommendations for application and use.
 - 6. Show compliance with the specific standards referenced.
 - 7. Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
 - 8. Identify dimensions which have been verified by field measurement.
 - 9. Show special coordination requirements for the product.

3.5 SAMPLES

- A. Samples:
 - 1. Provide samples that are the same as proposed product.
 - 2. Where unavoidable variations must be expected, submit "range" samples, minimum of 3 units, and describe or identify variations among units of each set.
 - 3. Where selection is required, provide full set of all options.
- B. Preparation:
 - 1. Attach a description to each sample.
 - 2. Attach name of manufacturer or source to each sample.
 - 3. Where compliance with specified properties is required, attach documentation showing compliance.
 - 4. Where there are limitations in availability, delivery, or other similar characteristics, attach description of such limitations.
 - 5. Where selection is required, the first submittal may be a single set of all options; after return of submittal with selection indicated, submit standard number of sets of selected item.
- C. Keep final sample set(s) at the project site, available for use during progress of the work.

3.6 REVIEW OF SUBMITTALS

- A. Submittals for approval will be reviewed, marked with appropriate action, and returned.
- B. Informational submittals: Submittals will be reviewed.

3.7 RETURN, RESUBMITTAL, AND DISTRIBUTION

- A. Submittals will be returned to the contractor by mail.
- B. Perform resubmittals in the same manner as original submittals; indicate all changes other than those requested by the architect.
- C. Distribution:
 - 1. Distribute returned submittals to all subcontractors and suppliers involved in work covered by the submittal.
 - 2. Maintain one copy for inclusion in the Owner's manual.

END OF SECTION 01300

SECTION 01400 - QUALITY CONTROL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. General quality control activities.
 - 2. Procedures for the following:
 - a. Preparation and maintenance of schedule of quality control activities.
 - b. Design performed by contractor.
 - c. Testing and evaluation of test results.
 - d. Inspections.
 - 3. Procedures for quality control activities performed by:
 - a. Public authorities having jurisdiction.
 - b. Independent testing agencies.
 - c. Contractor.
 - 4. Procedures for submittal of quality control documentation.
- B. Quality control activities required are specified in other sections.
- C. See General Conditions for additional requirements for testing, inspections, and approvals.
- D. Related Sections:
 - 1. Contractor's construction schedule: Elsewhere in Division 1.
 - 2. Submittal procedures: Elsewhere in Division 1.
 - 3. Concrete Testing: Division 3.
 - 4. Wood Truss Design: Division 6.
 - 5. Sprinkler Design: Division 15.

1.3 CONTRACT CONDITIONS

- A. Independent testing agencies, whether employed by the owner or the contractor, may not change the requirements of the contract documents and may not approve any portion of the work.

- B. Employment of testing agencies, by the contractor or the owner, shall not relieve the contractor of his obligation to perform the work in accordance with the contract documents.

1.4 DEFINITIONS

- A. Installer: Any entity who performs a construction activity, whether an employee, subcontractor, or sub-subcontractor of the contractor.
- B. Reference Standard: Any document incorporated into the specification by reference rather than by inclusion of complete text; including, but not limited to, voluntary specifications prepared by standards organizations and industry organizations.

1.5 REFERENCE STANDARDS

- A. Reference Standards - General:
 - 1. Comply with edition of standard in effect as of:
 - a. Date of agreement.
 - 2. Compliance with standards which are revised or reissued after that date will not be required unless incorporated into the contract documents by modification.
 - 3. Where applicable codes, laws, or regulations require editions of different dates, obtain instructions from the governing authorities as to which edition is required.
- B. The requirements of reference standards are binding on the contractor, just as if they were copied into the contract documents, but no provisions of reference standards shall alter the contractual relationship of the parties to the contract.
- C. Keep at the site a copy of each reference standard specified.

1.6 SUBMITTALS

- A. Schedule of Quality Control Activities:
 - 1. Submit within same time period as required for contractor's construction schedule.
 - 2. Distribute to:
 - a. The owner.
 - b. The architect.
 - c. Each entity performing work for which quality control activities are specified.

- B. Design Data: As specified in individual sections.
 - 1. Unless otherwise indicated, submit for review by the architect.

- C. Reports: Provide certified copies of reports.
 - 1. Unless otherwise indicated, submit for information only.
 - 2. Submit reports within 1 week after execution of quality control activity, but not later than the date of application for payment for the work to which the quality control activity relates.
 - 3. Reports shall be prepared by the entity performing the quality control activity.
 - 4. Submit copies directly to governing authorities when so directed.
 - 5. When the contractor employs an independent testing agency, submit copies directly to the architect.
 - 6. Include the following information in all types of reports:
 - a. Date of report.
 - b. Project name (and number, if applicable).
 - c. Description of the quality control activity.
 - d. Name, address, and telephone number of entity performing activity.
 - e. Date quality control activity was performed.
 - f. Specification section(s) involved.
 - g. Basis for evaluation (test method, etc.).
 - h. Results or conclusions, including evaluations and interpretations.
 - i. Title, name, and signature of person performing activity.
 - 7. Include the following information in all test reports:
 - a. Locations from which samples were taken, if any.
 - b. Ambient conditions at time of activity.
 - c. Recommendations for retesting, if any.

1.7 QUALITY ASSURANCE

- A. Qualifications of Structural Design Personnel: As indicated in individual sections; if not indicated, provide services of a professional engineer licensed in the state in which the project is located.

- B. Qualifications of Manufacturers: As indicated in individual sections.
 - 1. The term "experienced," unless otherwise indicated, means having 5 years of successful production of products similar to those to be used on this project.
 - 2. Where qualifications are required to be submitted but no specific qualifications are specified, use only experienced manufacturers.

- C. Qualifications of Installers: As indicated in individual sections.
 - 1. The term "experienced," unless otherwise indicated, means having satisfactorily completed similar work on 5 projects of similar scope and complying with applicable requirements of governing authorities.
 - 2. Where qualifications are required to be submitted but no specific qualifications are specified, use only experienced installers.

- D. Qualifications of Testing and Inspection Personnel:
 - 1. As indicated in individual sections.
 - 2. Independent Testing Agency Qualifications: When employed by the contractor:
 - a. A firm independent from the contractor's organization.
 - b. Approved by the architect.
 - c. Authorized to conduct business in the state in which the project is located.

- E. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either the National Bureau of Standards (NBS) standards or to accepted values of natural physical constants.

1.8 COORDINATION WITH OTHER ENTITIES

- A. Cooperate with other entities performing quality control activities.
- B. Provide samples of materials and design criteria as indicated and when requested.
- C. Provide other assistance, equipment, tools, and storage facilities as specified.
- D. If desired, make arrangements with those entities and pay for additional similar or related testing or inspection required for the contractor's use or convenience.

1.9 SEQUENCING AND SCHEDULING

- A. Prepare a schedule of quality control activities required.
 - 1. Provide the following information for each activity:
 - a. Specification section number.
 - b. Description of the activity.
 - c. Identification of test or inspection methods.
 - d. Enumeration of results required.
 - e. Number of tests required.
 - f. Number and type of samples to be taken, if any.

- g. Starting time of activity.
 - h. The date that the work will be ready for the owner's testing agency access.
 - i. Elapsed time required for activity.
 - j. Entity responsible.
 - k. Special requirements for activity.
- B. Coordinate quality control activities to avoid delay and to make it unnecessary to uncover work for testing or inspection.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Provide work of the specified quality; where quality level is not indicated, provide work of quality customary in similar types of work.
1. Where codes, laws, or regulations require work of higher quality or performance, provide work complying with those codes, laws, and regulations.
 2. Where two or more quality provisions of the contract documents conflict, comply with the most stringent requirement; where requirements are different but apparently equal, and where it is uncertain which requirement is most stringent, obtain clarification from the architect before proceeding.
 3. Actual quality may exceed the specified quality; verify that such differences are acceptable to the owner (other criteria may make excessive quality undesirable).
- B. Where the contractor is required to complete the design, use accepted methods and procedures resulting in work of the specified quality.
- C. Control products, suppliers, manufacturers, site conditions, installers, and workmanship in such a manner as to produce work of the specified quality.
- D. Comply with manufacturers' instructions and recommendations.
1. Keep a record of instructions and recommendations which supplement or conflict with the manufacturer's written instructions.
 2. When manufacturers' instructions and recommendations conflict with the contract documents, obtain clarification from the architect before proceeding.

- E. Use installers who are capable of producing work of the specified quality.
- F. Perform all quality control activities specified unless indicated to be performed by other entities.

3.2 TESTING

- A. Perform tests specified.
- B. When results of tests are unsatisfactory, make whatever changes or repairs are necessary and retest.
- C. Submit written report of each original test and of each retest.

3.3 INSPECTING

- A. Perform inspections specified.
- B. When inspections reveal unsatisfactory work, make whatever changes or repairs are necessary and reinspect.
- C. Submit written report of each original inspection and each reinspection.

3.4 PROTECTION AND REPAIR

- A. When work is uncovered during quality control activities, provide protection from damage.
- B. Correct work damaged by quality control activities; where repair is indicated as an unacceptable method, replace the work.

END OF SECTION 01400

SECTION 01500 - TEMPORARY FACILITIES AND SERVICES

PART 1 -GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Temporary utilities.
 - 2. Temporary construction.
 - 3. Protective facilities.
 - 4. Employee facilities.
 - 5. Administrative facilities.
 - 6. Temporary services.
 - 7. Construction equipment.
 - 8. Required temporary facilities and services include but are not limited to:
 - a. Access roads.
 - b. Drinking water facilities.
 - c. Dust control services.
 - d. Fire protection facilities, other than piped utilities.
 - e. Ice and snow removal.
 - f. Janitorial services.
 - g. Meeting room.
 - h. Project identification sign(s).
 - i. Public protective facilities required by law.
 - j. Telephone service.
 - k. Temporary enclosures for general building heating.
 - l. Temporary enclosures for protection from weather.
 - m. Use of new permanent elevators for construction.
 - n. Dumpster on site.
 - o. Water supply.
 - p. Use of permanent water service.
 - q. Heating and cooling.
 - (1) Include cost of fuel and power used.
 - r. Use of permanent heating, cooling, and ventilating systems.
 - s. Electrical service, except extension cords.
 - (1) Include electric service usage charges.

- 9. Temporary lighting.
- 10. Use of permanent electrical systems.

B. Related Sections:

- 1. Access to site: Elsewhere in Division 1.
- 2. Regulatory requirements: Elsewhere in Division 1.
- 3. Storage and protection of materials and equipment: Elsewhere in Division 1.

C. FM P7825 -- Approval Guide 1992; Factory Mutual System; 1992.

1.3 DEFINITIONS

- A. Temporary Facilities: Construction, fixtures, fittings, and other built items required to accomplish the work but which are not incorporated into the finished work.
- B. Temporary Utilities: A type of temporary facility; primary sources of electric power, water, natural gas supply, etc., obtained from public utilities, other main distribution systems, or temporary sources constructed for the project, but not including the fixtures and equipment served.
- C. Temporary Services: Activities required during construction which do not directly accomplish the work.
- D. Construction Equipment: A type of temporary facility, consisting of fixed equipment used to accomplish the work, determined by the method the contractor chooses to accomplish the work.

1.4 SUBMITTALS

- A. Copies of permits required by public authorities.

1.5 QUALITY ASSURANCE

- A. Comply with requirements of governing authorities, as to type, quantity, location, and use of temporary facilities.
- B. Comply with requirements of governing authorities, as to type and frequency of temporary services.
- C. Comply with requirements of public utilities affected.

1.6 PROJECT CONDITIONS

- A. Obtain easements where required.

- B. Use of permanent facilities prior to substantial completion is subject to the owner's approval and conditions.
 - 1. Each permanent facility used for construction purposes shall be operated, maintained, and protected during such use by the original installer.
 - 2. Specified warranties shall not be reduced or voided by temporary use.

1.7 SEQUENCING AND SCHEDULING

- A. Maintain required facilities until not needed or until shortly before substantial completion; remove facilities before substantial completion.
 - 1. Exception: Where use of permanent facilities is allowed.
- B. Change over to use of permanent facilities, when applicable, as soon as possible, except when use of permanent facilities is not allowed.

PART 2 -PRODUCTS

2.1 MATERIALS

- A. General: Provide materials which are both suitable for the use and durable enough to withstand the use and abuse to be expected.
- B. Temporary Heating Units: UL or FM labeled for the fuel used; do not use gasoline-burning, open burning, or solid fuel heaters or salamanders.
 - 1. Use equipment that is known to be safe and that will not damage work in progress.

2.2 EMPORARY UTILITIES

- A. Temporary Water Service:
 - 1. Provide water adequate for demand of construction operations.
 - a. Take precautions to prevent damage due to leaks and spills inside building.
- B. Temporary Power:
 - 1. Provide electricity adequate for demand of construction operations.
 - 2. Electrical service:
 - a. Obtain temporary service from local utility.
 - b. Provide disconnect at connection to service.
 - c. Provide service conductors and equipment.
 - d. Provide metering equipment.
 - (1) Other temporary facilities specified.
 - e. Provide service to other temporary facilities specified.

2.3 PROTECTIVE FACILITIES

- A. Fire Protection Facilities: Provide at least the temporary facilities required by the authorities having jurisdiction.
 - 1. Fire extinguishers to be installed in the completed building shall not be used during construction.
 - 2. Put permanent facilities into operation as soon as possible.

2.4 EMPLOYEE FACILITIES

- A. Temporary Lighting: Provide at least the lighting required by law.
- B. Toilet Facilities: Provide temporary toilet facilities.
 - 1. Clean and maintain toilet facilities.
 - 2. Provide toilet tissue for each facility.

2.5 ADMINISTRATIVE FACILITIES

- A. Meeting Room: Provide space in one of the contractor's field offices on site.
 - 1. Provide heating and insulation sufficient to maintain minimum of 70 degrees F interior temperature in winter.
 - 2. Provide air conditioning sufficient to maintain maximum of 75 degrees F interior temperature in summer.
 - 3. Provide following furnishings:
 - a. Conference table.
 - b. 8 chairs.
 - c. Plan table.
- B. Telephone Service:
 - 1. Provide at least one telephone on site.
 - 2. Provide pay telephone for employees' use.
 - 3. Display construction-related phone numbers at each phone.
 - a. Fire emergency number.
 - b. Rescue emergency number.
 - c. Physician.
 - d. Contractor's home office.
 - e. Owner's representative.
 - f. Architect's representative.
 - g. Major subcontractors' home offices.

- C. Project Sign(s): Provide 1.
 - 1. Posts: PVC, Metal or treated wood.
 - 2. Size: 4 x 8 feet.
 - 3. Material: 3/4" exterior grade plywood.
 - 4. Color: White with teal lettering.
 - 5. Provide the following information on sign:
 - a. Project name.
 - b. Owner's name.
 - c. Architect's name.
 - d. Contractor's name.
 - e. Financing agency's name.
 - 6. Project sign: See drawings.
 - 7. Submit sign to the city for review and approval in accordance with their city sign ordinance.
 - 8. No other signs or advertisements will be allowed to be displayed without the written approval of the Owner.
 - 9. Locate where visible to the public.

2.6 TEMPORARY CONSTRUCTION

- A. Access Roads: Provide temporary roads as required.
 - 1. Provide traffic surfaces which are adequate for the loadings expected and which will be durable in normal weather conditions.
 - 2. Provide paving at well-traveled routes and delivery areas.
- B. Temperature Control and Ventilation Facilities: Provide adequate facilities:
 - 1. To provide proper conditions for installation.
 - 2. For drying and curing of completed work.
 - 3. For protection from deterioration due to high or low temperatures and humidity.
 - 4. To provide suitable working conditions.
 - 5. Provide heating after building is enclosed, adequate to maintain minimum of 60 degrees F.
 - 6. Permanent equipment and facilities may be used.
- C. Temporary Enclosures for Heating: When general building heating is required for construction operations before completion of building enclosure, provide temporary construction to close openings in building enclosure.
- D. Temporary Enclosures for Weather Resistance: When building enclosure is not yet complete but interior construction may be damaged by weather, provide temporary enclosures adequate to keep out weather.

2.7 TEMPORARY FENCING

- A. Provide six foot high chain link fence with pedestrian and vehicular gates to prevent unauthorized entry to construction areas. The fencing shall allow for Owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition. Location of fence to be coordinated with Owner. At a minimum the fence shall enclose the area of new work and paving shown on the site plan.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plant life designated to remain. Replace damaged plant life.
- D. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

PART 3 - EXECUTION

3.1 GENERAL

- A. Cooperate with other contractors in location of temporary facilities.

3.2 TEMPORARY SERVICES

- A. Fire Prevention: Provide a dumpster on the site. Empty dumpster when it is full.
- B. Janitorial Services:
 - 1. Clean toilet facilities at least once a week.
 - 2. Clean meeting room at least once a week.
- C. Dust Control Services: Keep down dust on roads regularly.
- D. Ice and Snow Removal: Remove ice and snow regularly.

3.3 TERMINATION AND REMOVAL

- A. Remove temporary facilities when no longer needed, or when use of appropriate permanent facility is approved, but not later than substantial completion.
 - 1. Exception: When longer usage is requested by the architect or owner.

- B. Complete permanent work delayed until removal of temporary facilities.
- C. Permanent Facilities Used during Construction: Clean; replace parts that are worn in excess of that expected during normal usage.
- D. Dispose of project sign(s) not claimed by the owner.

END OF SECTION 01500

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. General product requirements, including:
 - a. General specification requirements for all products.
 - b. Product options.
 - c. Procedures for substitution requests.
 - d. General requirements and procedures for maintenance materials and tools.
 - 2. General requirements for product documentation, including:
 - a. Requirements and procedures for schedule of products.
 - b. General requirements for operation and maintenance data.
 - c. General requirements for warranties.
 - 3. General procedures for products including:
 - a. Procedures for transportation and handling.
 - b. Procedures for delivery and receiving.
 - c. Procedures for storage.
- B. Related Sections:
 - 1. Submittal transmission, handling, and action procedures: Elsewhere in Division 1.
 - 2. General installation procedures: Elsewhere in Division 1.
 - 3. Owner instruction for equipment and systems: Elsewhere in Division 1.
 - 4. Project record documents: Elsewhere in Division 1.

1.3 DEFINITIONS

- A. Damage: Any sort of deterioration whether due to weather, normal wear and tear, accident, or abuse, resulting in soiling, marring, breakage, corrosion, rotting, or impairment of function.

1.4 SUBMITTALS

- A. Schedule of Products: Submit for approval.
- B. Final Schedule of Products: Submit for project record.

- C. Operation and Maintenance Data: Submit for information only.
- D. Warranties: Submit for project record.
- E. Receipts for maintenance materials and tools.

1.5 WARRANTIES

- A. Warranties are specified in each section. Where not specified and the minimum warranty on a component of the project shall be warranted for at least two years from the date of substantial completion.
All components installed with in the project are to be "Year 2000 Compliant."

PART 2 - PRODUCTS

2.1 GENERAL

- A. Components required to be supplied in quantity within a specification section shall be identical, interchangeable, and made by the same manufacturer.

2.2 MAINTENANCE MATERIALS AND TOOLS

- A. Maintenance Materials: Parts and materials for repair and maintenance; specific items required are specified in product sections.
 - 1. Provide products and tools which are identical to those used in the work; if necessary to obtain identical items, order at the same time as products to be installed or tools to be used in the work.
- B. Package appropriately and label to show type and quantity of contents.
- C. Deliver, handle, and store in the same manner as products to be installed.
- D. Do not turn over to the owner until date of substantial completion, unless otherwise approved by the owner.
- E. Deliver to the owner; unload.
- F. Obtain receipt prior to final payment.

PART 3 - EXECUTION

3.1 PRODUCT OPTIONS

- A. It is the contractor's responsibility to select products which comply with the contract documents and which are compatible with one another, with existing work, and with products selected by other contractors.
 - 1. Verify that electrical characteristics of products are compatible with electrical systems; notify architect of all discrepancies.
- B. No substitute products will be considered, except in the event of unavailability of the specified product through no fault of the contractor.
- C. Definition of Substitute Product: Any product which does not meet the requirements of the contract documents, whether in product characteristics, performance, quality, or manufacturer or brand names, is considered a substitute.
- D. Product Options: Where products are specified using more than one method, such as description with a manufacturer list, use a product meeting the requirements of both specification methods.
- E. Products Specified by Reference Standard: Use any product meeting the specification. Provisions of reference standards shall not modify the responsibilities of the owner or architect as defined in the contract documents.
- F. Products Specified by Description: Use any product meeting the specification.
- G. Products Specified by Listing a Brand Name Product as the "Basis of Design": Provide a product equivalent to the product specified within the limits of variation specified; submit substitution request for all products other than that listed as basis of design.
- H. Products Specified by Listing Brand Names(s): Provide one of the products listed; no substitutions will be allowed.
- I. Products Specified by Listing Manufacturer(s): Provide a product meeting the specification and made by one of the manufacturers listed.

3.2 SUBSTITUTION PROCEDURE

- A. Submission of request for substitution shall constitute a representation by the contractor that he:
 - 1. Has investigated the proposed product and determined that it is equal to or better than the specified product. Absence of an explicit comparison of any characteristic of the proposed product to the specified product shall constitute a representation that the proposed product is equal to or better than the specified product with regard to that characteristic.
 - 2. Will provide the same warranty for the proposed product as for the specified product.
 - 3. Will coordinate the installation and make other changes which may be required for the work to be complete in all respects, including:
 - a. Redesign.
 - b. Additional components and capacity required by other work affected by the change.
 - 4. Waives all claims for additional costs and time extensions which subsequently may become apparent and which are caused by the change.
 - 5. Will reimburse the owner for additional costs for evaluation of the substitution request, redesign if required, and reapproval by authorities having jurisdiction if required.
- B. Substitutions will not be considered when acceptance would require substantial revision of the contract documents.
- C. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request.
- D. Substitution requests will not be considered when submitted directly by subcontractor or supplier.
- E. Substitution Request Procedure: Submit written request with complete data substantiating compliance of the proposed product with the requirements of the contract documents.
 - 1. Submit request to the architect.
 - 2. Submit 3 copies of each request and accompanying data.
 - 3. Submit all requests on a standard form.
 - 4. Only one request for substitution will be considered for each product.

- F. Data Required with Substitution Request: Provide at least the following data:
 - 1. Identify product by specification section and paragraph number.
 - 2. Manufacturer's name and address, trade name and model number of product (if applicable), and name of fabricator or supplier (if applicable).
 - 3. Complete product data.
 - 4. An itemized comparison of the proposed product to the specified product.
 - 5. Net amount of change to the contract sum.
 - 6. List of maintenance services and replacement materials available.
 - 7. Statement of the effect of the substitution on the construction schedule.
 - 8. Description of changes that will be required in other work or products if the substitute product is approved.
- G. The architect will determine acceptability of the proposed substitution.
- H. When the proposed substitution is not accepted, provide the product (or one of the products, as the case may be) specified.

3.3 SCHEDULE OF PRODUCTS

- A. Prepare a complete schedule of major products used, including the following for each product:
 - 1. Manufacturer's name.
 - 2. Brand or trade name.
 - 3. Model number, if applicable.
 - 4. Reference standard, if more than one is applicable.
 - 5. Arrange products in the schedule by specification sections; indicate paragraph where specified.
- B. Prepare and submit a preliminary schedule within 30 days after award of contract ; resubmit when revised; submit final schedule prior to final payment.
- C. Schedule of products shall not be used to obtain approval of substitute products; make separate request for substitution.

3.4 OPERATION AND MAINTENANCE DATA

- A. Provide operation and maintenance data as specified in individual product sections.
 - 1. Provide data sufficient for operation and maintenance by owner without further assistance from the manufacturer.
 - 2. Provide completed data in time for use during owner instruction.
- B. Data Required For Products - General:
 - 1. Name of manufacturer and product.
 - 2. Name, address, and telephone number of subcontractor or supplier.
 - 3. Local source of replacements.
 - 4. Local source of replaceable parts and supplies.
- C. Product Data: Where product data is specified for inclusion in operation and maintenance data, provide manufacturer's data sheets marked to indicate specific product and product options actually installed; delete inapplicable data.
- D. Project Record Documents: Provide an additional copy of applicable record documents for inclusion with the operation and maintenance data.
- E. Coordination Drawings: When coordination drawings are prepared, include a copy with the operating and maintenance data.
- F. Equipment: Provide at least the following information:
 - 1. Product data giving equipment and function description, with normal operating characteristics and limiting conditions.
 - 2. Starting, operating, and troubleshooting procedures.
 - 3. Cleaning and maintenance requirements and procedures.
 - 4. External finish maintenance requirements.
 - 5. List of maintenance materials required.
 - 6. List of special tools required.
 - 7. Parts list: List all replaceable parts, with ordering data.
 - 8. Recommended quantity of spare parts to be maintained in storage.
- G. Systems: Provide overall function description, with diagrams, prepared especially for this project.
- H. Form of Data: Prepare data in the form of an instructional manual.
 - 1. Arrange content logically, using section numbers and sequence of sections indicated on the table of contents of this project manual.

2. When multiple volumes are used, arrange by related subjects; identify contents in cover title.
3. Assemble into 3-ring binders with maximum 2-inch ring size.
 - a. Hardback, cleanable plastic covers.
 - b. Identify each book with title "Operation and Maintenance Instructions" and project name.
 - c. Page size 8-1/2 by 11 inches, maximum.
 - d. Prepare special typewritten data on minimum 20-pound paper.
 - e. Provide tabbed divider for each product and system.
 - f. Drawings: Bind large-size drawings separately.
4. Provide table of contents for each volume listing:
 - a. Name of the project.
 - b. Name, address, telephone number, and contact name of:
 - (1) Architect.
 - (2) Contractor.
 - c. Index of products and systems included in volume.

3.5 WARRANTIES

- A. Provide warranties as specified in individual product sections.
- B. Manufacturer Warranties: Manufacturer's standard product warranty running for the manufacturer's standard term, unless otherwise indicated.
 1. Submit copies of all manufacturer warranties which extend beyond the end of the contract correction period.
- C. Special Project Warranties: Written warranty commencing at date of substantial completion, running for the term indicated, and signed by the entities specified.
 1. Where completion of warranty item is materially delayed beyond the date of substantial completion, provide warranty commencing on date of acceptance.
 2. Submit each special project warranty.
- D. Provide documentation that the items installed are "Year 2000 Compliant"
- E. Provide at least 3 copies of each executed warranty.
- F. Show actual date of commencement on each warranty.

3.6 TRANSPORTATION AND HANDLING

- A. Require supplier to package finished products in a manner which will protect from damage during shipping, handling, and storage.

- B. Transport products by methods which avoid damage.
- C. Deliver in dry, undamaged condition in manufacturer's unopened packaging.
- D. Provide equipment and personnel adequate to handle products by methods which prevent damage.
- E. Provide additional protection during handling where necessary to prevent damage to products and packaging.
- F. Lift large and heavy components at designated lift points only.

3.7 DELIVERY AND RECEIVING

- A. Arrange deliveries of products to allow time for inspection prior to installation.
- B. Coordinate delivery to avoid conflict with the work and to take into account both the conditions at the site and the availability of personnel, handling equipment, and storage space.
- C. Clearly mark partial deliveries to identify contents, to permit easy accumulation of entire delivery, and to facilitate assembly.
- D. Promptly inspect shipments and remedy damage, incorrect quantity, incompleteness, improper or illegible labeling, and noncompliance with requirements of contract documents and approved submittals.

3.8 STORAGE

- A. No indoor storage areas are available on site.
- B. General Storage Procedures:
 1. Store products immediately on delivery.
 2. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
 3. Store in a manner to prevent damage to the stored products and to the work.
 4. Store moisture-sensitive products in weathertight enclosures.
 5. Store indoors if necessary to keep temperature and humidity within ranges required by manufacturer.
 6. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
 7. Arrange storage to provide access for inspection and inventory.

8. Periodically inspect and remedy damage and noncompliance with required conditions.
- C. Loose Granular Materials: Store on solid surfaces in well-drained area; prevent mixing with foreign materials.
- D. Exterior Storage:
1. Cover products subject to weather damage with impervious sheet covering; provide ventilation to avoid condensation.
 2. Provide surface drainage to prevent runoff or ponded water from damaging stored products.
 3. Prevent damage and contamination from refuse and chemically injurious materials and liquids.
 4. Store fabricated products on substantial platforms, blocking, or skids above the ground, sloped to drain.

END OF SECTION 01600

SECTION 01700 - CONSTRUCTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 1. General construction and installation procedures.
 2. Building Air infiltration and Blower Door Testing.
 3. Cutting procedures.
 4. Patching procedures.
 5. Correction of defective work.
 6. Cleaning during construction.
 7. Facility startup.
 8. Instruction of the owner's personnel.
 9. Project completion procedures.
 10. Final property survey.
 11. Final cleaning.
- B. Related Sections:
 1. Cleaning requirements for specific products and systems: Applicable product sections in Divisions 2-16.
 2. Final payment procedures: Elsewhere in Division 1.
 3. General product installation requirements: Elsewhere in Division 1.
 4. Testing, adjusting, and balancing of mechanical systems: Division 15.
 5. Waste removal services: Elsewhere in Division 1.

1.3 DEFINITIONS

- A. Concealed Spaces: Spaces which are not accessible after completion of construction.
- B. Cutting: Removal of material by cutting, sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation.
- C. Damage: Any sort of deterioration whether due to weather, normal wear and tear, accident, or abuse, resulting in soiling, marring, breakage, corrosion, rotting, or impairment of function.

- D. Debris: Rubbish, waste materials, litter, volatile wastes, and similar materials, with the exception of surplus materials which are to become the property of the owner.
- E. Furnish: Order and deliver noted item to the site as part of the project cost. Installed by others.
- F. Install: Install or construct item noted only as part of the project cost. Item to be furnished by others.
- G. Operational Elements: Equipment, moving parts, electrical conductors, sound and vibration control materials, waterproofing, vapor retarders, piping, ducts, tanks, and other similar materials and components which convey or retard the passage of liquids, gases, heat, light, persons, animals, or insects or which perform a similar function; not including structural elements.
- H. Patching: Restoration to completed condition by patching, repairing, refinishing, finishing, filling, closing up, and similar operations.
- I. Provide: Furnish and install item noted as part of the project cost.
- J. Replacement: Replace the entire element, surface, or product.
- K. Safety-Related Elements: Materials and assemblies whose principal function is the promotion of the safety of the building and its occupants, including fire and smoke barriers, fireproofing, emergency egress doors and windows, guardrails, equipment guards, and other similar construction.
- L. Spaces Not Normally Occupied: Accessible spaces such as roofs, accessible plenums and shafts, accessible spaces above ceilings, trenches, equipment vaults, manholes, accessible attics, and similar spaces, but not including the interior of duct or concealed spaces.

1.4 SUBMITTALS

- A. Proposals for Cutting and Patching: Submit request sufficiently in advance of the time the work is to be performed to obtain approval; include:
 - 1. Description of the nature of the work and how it is to be performed, including reasons why cutting cannot be avoided.
 - 2. Description of results expected, including impact on safety and on structural, operational, and visual qualities.
 - 3. If utilities are affected, describe the changes required and be specific as to how long service will be cut off.

4. If cutting of structural work results in the need for additional reinforcement, provide details and engineering calculations to show how that reinforcement satisfies the original structural requirements.

B. Field Correction Requests: Submit immediately upon discovery of deviation required; include a detailed description of the problem, recommended changes, and reasons it is not possible to comply with the contract documents.

1.5 QUALITY ASSURANCE

A. Qualifications of Property Surveyor: Registered land surveyor licensed in the state in which the project is located.

B. Qualifications of Surveyor: Registered land surveyor licensed in the state in which the project is located.

C. Cleaning: Perform cleaning in accordance with the recommendations of the manufacturer or fabricator of the product or system. Use only cleaning materials and tools which are specifically recommended, which are not hazardous to health or property, and which will not damage finishes.

1.6 PROJECT CONDITIONS

A. Take precautions to prevent fires and to facilitate fire-fighting operations.

1. Keep flammable materials in non-combustible containers; store away from potential fire sources; remove flammable waste regularly.

2. Keep temporary and permanent fire fighting facilities readily accessible; keep fire fighting routes open.

3. Do not allow smoking in areas where highly combustible or explosive materials are present.

4. Carefully supervise the operation of potential fire sources, including heating units.

5. Conduct welding operations in manner to prevent fire; comply with local regulations.

B. Take precautions to prevent accidents due to physical hazards:

1. Provide barricades, warning lights, or signs as required to inform personnel and the public of the hazard being protected against.

2. Safety barricades: Comply with regulations.

3. Provide temporary walkways where walking surfaces are hazardous.

4. Notify the owner before beginning work that involves hazardous operations, including use of explosives and the like.

- C. Take care to prevent pollution of air, water, and soil.
 - 1. Comply with environmental protection regulations.
 - 2. Limit effluent and rainwater runoff into waterways as required by regulations.
 - 3. Do not dump contaminants in areas that will result in contamination of waterways.
- D. Minimize discharge of effluent and rainwater runoff into sewers.
 - 1. Control sediment discharge into sewers; filter out construction debris, soil, and contaminants.
 - 2. Comply with regulations and orders of public utilities regarding use of sewers.
 - 3. Where disposal of effluent or rainwater by means of sewers is not lawful or is not possible, provide alternative methods of disposal.
- E. Prevent erosion due to rainwater runoff.
- F. Control windblown dust; prevent erosion to site and nuisance to neighbors.
- G. Prevent flooding of excavations, below-grade construction, and adjacent properties due to rainwater runoff.
- H. Protect existing property indicated to remain, including:
 - 1. Plants and trees, as indicated on the drawings.
 - 2. Any other items indicated on Drawings.
- I. Do not use tools or equipment which produce harmful levels of noise.
 - 1. Do not use noise-making tools or equipment between 6 p.m. and 7 a.m., weekdays and Saturday, and all day Sundays and holidays.
- J. Keep the site and adjacent public ways free of hazardous and unsanitary conditions and public nuisances.
- K. Control rodents and other pests; prevent infestation of adjacent sites and buildings due to pests on this site.
- L. Keep public streets free of debris due to this work.
- M. Provide adequate traffic control by means of signs, signals, and flagmen, as necessary.
- N. Provide temporary means of draining roofs where required.

- O. Conduct construction operations so that no part of the work is subjected to damaging operations or influences which are in excess of those to be expected during normal occupancy conditions.
- P. Conduct construction operations so that waste of power, water, and fuel is avoided.
- Q. Provide temporary supports as required to prevent movement and structural failure.
- R. Install products only during environmental conditions which will ensure the best possible results.

1.7 BUILDING AIR INFILTRATION AND BLOWER DOOR TESTING

- A. Building Air Infiltration :
 - 1. All components and systems are to be installed and constructed to prevent air infiltration through assemblies and around penetrations.
 - a. Manufacturer's installation instructions shall be strictly adhered to, where air infiltration is affected.
 - b. The annular space of all penetrations shall be sealed using fire stopping where it is already required or caulking and foam sealant where a fire rating issue is not present.
 - 2. At key stages of building construction an energy consultant and/or testing agent shall inspect the construction. The stages of construction for inspection shall be as follows. Additional inspections may be required as needed:
 - a. Completion of framing and windows installation.
 - b. Completion of rough-in installations.
 - c. Completion of insulation installation.
 - d. Completion of drywall and finish carpentry.
 - e. Completion of exterior siding and all exterior wall penetrations.
 - 3. Items indicated to be addressed shall be addressed to the satisfaction of the energy consultant or testing agent prior to installation of the next stage of construction.
 - 4. The costs of energy consultant inspection services shall be at the Owner's expense.
- B. Blower Door Testing:
 - 1. At the completion of the project a full building Blower Door Test and individual unit Blower Door Tests shall be conducted following ASTM E1827-96 (2002) or ASTM E779 as determined by the testing agency.
 - 2. The General Contractor shall assist in this testing by providing personnel to set systems and components as needed to conduct the testing.

3. The costs of standard Blower Door Testing services shall be at the Owner's expense.
4. The General Contractor prior to signing the contract for construction shall specifically agree to meet the following air infiltration performance values for the entire building and for each unit.
 - a. Air Infiltration Through Building Shell: .15 ACH or less.
 - b. Total Building Air Infiltration:
 - Building 1 : 1843 CFM or less
 - Building 2 : 1983 CFM or less
 - c. Effective Leakage Area per 100 Square Feet of Building Shell:
2 SF or less.
5. The General Contractor shall agree to assist in determining the deficiency in the building that is causing the building to fail to meet the performance standards stated here. If significant additional testing is needed to determine the deficiency, the cost at that testing shall be reimbursed to the Owner by the General Contractor.
6. The General Contractor shall agree to address and correct the deficiency as determined through collective review with the energy consultant or testing agent.

1.8 SEQUENCING AND SCHEDULING

- A. Install products only at the time and in the sequence which will ensure the best possible results.
- B. Coordinate required administrative activities with related construction activities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Patching Materials: Identical to the materials of the work to be cut, unless indicated as specific materials specified in other sections.

PART 3 - EXECUTION

3.1 GENERAL EXAMINATION REQUIREMENTS

- A. Prior to performing work, examine the applicable substrates and the conditions under which the work is to be performed.
- B. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding.

- C. Conditions which could have been discovered by examination will not be allowed as cause for claims for extra work.
 - 1. In particular, verify the following:
 - a. Underground utilities.
 - b. Other underground construction.
 - c. Location and invert elevation of points of connection to piped utilities.
 - d. Abutters Fence.
- D. Verify that utility requirements of operating equipment are compatible with building utilities.
- E. Verify space requirements of items which are shown diagrammatically on the drawings.

3.2 GENERAL PREPARATION REQUIREMENTS

- A. Take field measurements as required to fit the work properly.
- B. Recheck measurements prior to installing each product.

3.3 GENERAL INSTALLATION PROCEDURES

- A. Accurately locate the work and components of the work; make vertical work plumb; make horizontal work level.
- B. See sections describing specific parts of the work for additional requirements.
- C. Where space is limited, install components to maximize space available for maintenance and to maximize ease of removal for replacement.
- D. In finished areas, conceal pipes, ducts, and wiring within the construction, unless otherwise indicated.
- E. Coordinate exact locations of fixtures and outlets with finish elements.
- F. Install work in such manner and sequence as to preclude, if possible, or at least to minimize, cutting and patching.
 - 1. Do not cut any operational elements.
 - 2. Do not cut safety-related elements.

3.4 CLEANING AND PROTECTION

- A. Remove debris from concealed spaces prior to enclosing the space.

- B. Keep the site and the work free of waste materials and debris.
 - 1. Remove waste from site periodically.
 - 2. When temperature exceeds or is expected to exceed 80 degrees F, remove waste at frequency necessary to prevent development of health hazards and nuisance odors.
 - 3. Keep hazardous and unsanitary materials in containers separate from other waste.

- C. Clean areas in which work is to be done to level of cleanliness necessary for proper execution of that work.
 - 1. Where dust would impair execution of work, broom- and vacuum-clean the entire interior area and keep clean.

- D. Keep installed work clean, and clean again when soiled by other operations.
 - 1. Provide periodic cleaning as required to prevent damage due to soiling.
 - 2. Remove liquid spills promptly.

- E. Protect installed work from soiling and damage.
 - 1. Provide protective coverings as required.
 - 2. Provide protective coverings for work which may be damaged by subsequent operations.
 - 3. Where heavy abuse is expected, use minimum of plywood for protection.
 - 4. Maintain protective coverings until substantial completion.

3.5 CUTTING AND PATCHING PROCEDURES

- A. Use specified cutting and patching procedures when cutting or patching is required for any of the following activities:
 - 1. Fitting the parts of the work together.
 - 2. Repairing existing work to remain.
 - 3. Installing ill-timed work.
 - 4. Removing and replacing defective and nonconforming work.
 - 5. Removing samples of work for testing.
 - 6. Making openings in elements of work for penetrations, such as for piping, conduit, duct, and the like.
 - 7. Uncovering work for observation.
 - 8. Repairing damage.

- B. Perform cutting and patching at earliest time feasible, unless otherwise indicated or directed by the architect.

- C. Use procedures specified in applicable product sections as well as those specified in this section:
 - 1. Use procedures recommended by original installer, when such information is available.
 - 2. Where required, obtain approval of procedures by the architect.
 - 3. Cut using methods that are least likely to damage adjacent work and work to remain and which will provide proper surfaces for patching.
 - 4. Make cuts neatly with minimum disturbance of adjacent work.
 - a. Use appropriate tools intended for sawing or grinding and not for chopping or hammering.
 - b. Do not use pneumatic tools without prior approval.
 - 5. Where installation of similar new work is included, perform patching in manner specified for installation of new work.
 - 6. Where new work is inserted into or through the work that is cut, fit the patched work tightly to the new work.
 - 7. Patch with seams which are durable and as invisible as possible.
 - 8. Repair substrate prior to patching finish.

- D. Employ skilled workers to perform cutting and patching work.
 - 1. Use the original installer of the work to perform cutting and patching of the following:
 - a. Any products so indicated in the applicable product section.

- E. Work Exposed to View: Do not cut or patch in a manner that would result in a lessening of the building's aesthetic value, as determined by the architect.
 - 1. Generally, cut from exposed side into concealed spaces to avoid unnecessary damage to finish.
 - 2. Do not cut and patch in a manner that would result in substantial visual evidence of cut and patch work.
 - 3. Restore exposed patched finishes in a manner which eliminates evidence of patching and refinishing.
 - a. For continuous surfaces, extend refinish to nearest intersection, with a neat transition to adjacent surfaces.
 - b. For assemblies: Refinish entire unit.
 - c. Painted piping, conduit, and duct: Clean and repaint.
 - 4. Remove and replace work which is patched in a visually unacceptable manner.

- F. Structural Elements: Maintain structural capacity; do not increase deflection under design load; provide reinforcing where required.
 - 1. See structural sections for additional requirements.
 - 2. Before cutting any structural member, obtain the architect's approval of the proposed method.

- G. Existing Construction:
 - 1. Patch existing work to match adjacent existing work to remain.
 - 2. Where specified procedures for similar new work are applicable, use those procedures for cutting and patching existing construction.
 - 3. Take precautions to avoid damage to unanticipated utilities and structural elements. If such elements are encountered, report nature and extent to the architect and request instructions as to how to proceed.
- H. Concealed Work: Uncover the concealed work, cut and patch, and patch the covering work.
- I. Concrete and Masonry: Use saws or drills which produce a neat cut; remove in small sections.
- J. Insulation: Replace insulation whenever it is cut in order to modify the element it is insulating.
- K. Slabs on Grade: Use methods that will not crack or disturb adjacent slabs or partitions.
- L. Protect that part of the project which is exposed during cutting and patching operations from adverse weather.
- M. Cover openings made whenever they are not in use.

3.6 INSTALLATION OF COMPONENTS

- A. Install all products in accordance with manufacturer's instructions and recommendations, whether conveyed in writing or not.
- B. Mounting Heights: Where mounting heights are not indicated, mount at heights directed by the architect.
- C. Separate incompatible materials with suitable materials or spacing.
 - 1. Prevent cathodic corrosion.
- D. Provide all anchors and fasteners required and use methods necessary to securely fasten work.
 - 1. Allow for thermal expansion and contraction, and for building movement.

- E. Joints in Exposed Work:
 - 1. Make joints of uniform widths.
 - 2. Where joint locations are not indicated, arrange joints for the best visual effect.
 - a. When in doubt, obtain the architect's instructions.
- F. After installation, adjust operating components to proper operation.

3.7 PROCEDURES FOR CORRECTION OF WORK

- A. The following must be replaced (repair is not acceptable):
 - 1. Damaged surfaces exposed to view which cannot be repaired without visible evidence of repair.
 - 2. Components which cannot be repaired to proper operating condition.
 - 3. Chipped and broken glass.
 - 4. Scratched transparent materials.
 - 5. Scratched reflective surfaces.
- B. Repair or Replace:
 - 1. Components which do not operate properly.
 - 2. Surfaces exposed to view which cannot be cleaned to original condition.
 - 3. Permanent facilities used during construction.
 - 4. Other defective work.
- C. Acceptable Repair Methods:
 - 1. Replacing parts.
 - 2. Refinishing.
 - 3. Touching up with matching materials.
 - 4. Proper adjustment of equipment.
- D. When it is necessary to deviate from the contract documents in order to accomplish corrective action, submit a field correction request.
- E. Restore permanent facilities used during construction to specified condition.

3.8 FACILITY STARTUP

- A. Put each item of equipment and each system into full, satisfactory operation.

- B. Prior to Startup:
 - 1. Verify that equipment and systems are complete, correctly connected to utilities, and tested.
 - a. Comply with requirements of manufacturer.
 - 2. Inspect and test as required to ensure that work is installed as specified and to determine suitability for energizing.
 - 3. Provide power and fuel for startup and testing.
 - 4. Change over from temporary to permanent utility sources.
 - 5. Re-adjust and lubricate operating components as required to ensure smooth and unhindered operation.
 - a. Check drive rotations, belt tension, control sequences, and other features which might cause damage if not properly adjusted.
 - 6. When required by manufacturer, have manufacturer's representative prepare for startup or supervise such preparation.
- C. Notify the architect a minimum of 10 days prior to startup of each item and system.
- D. Execute startup under supervision of responsible personnel in accordance with the manufacturer's instructions.
 - 1. When required by manufacturer, have manufacturer's representative perform startup.
- E. After startup, adjust equipment and systems as required for proper operation.
 - 1. Where specified, perform tests or inspections to determine status of operation.
- F. Demonstrate the operation and maintenance of equipment and systems to personnel designated by the owner, prior to substantial completion.
 - 1. Have final operating and maintenance data available during demonstration.
- G. For equipment and systems which have different operation at different seasons, demonstrate operation during subsequent seasons until fully demonstrated.

3.9 INSTRUCTION OF THE OWNER'S PERSONNEL

- A. Instruct personnel designated by the owner in the operation and maintenance of equipment and systems, prior to final payment.
 - 1. Explain all modes of operation and types of maintenance required.
 - 2. Demonstrate all functions, including startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown.

3. Review terms of warranties and procedures for obtaining warranty service.
 4. Review maintenance agreements and other similar commitments which extend past final completion.
 5. Have operating and maintenance data available for use during instruction.
 - a. Review contents in detail.
 - b. Prepare and insert additional data when need for such becomes apparent during instruction.
- B. Arrange times and places of instruction with the owner.
- C. Provide instruction by qualified personnel of the contractor, unless otherwise specified.
- D. For equipment and systems which have different operation at different seasons, provide instruction during subsequent seasons until all modes of operation have been covered.

3.10 FINAL CLEANING

- A. Remove materials and equipment which are not part of the work and all debris from the site prior to substantial completion.
1. Remove all surplus materials which are to remain property of the contractor; obtain the owner's instructions as to disposition of surplus material remaining on site and deliver, store, or dispose of as directed.
 2. Remove protective coverings.
 3. Remove temporary facilities.
- B. Dispose of debris in a lawful manner.
1. Do not burn or bury debris on the site.
 2. Do not dispose of volatile wastes in storm or sanitary drains.
- C. Perform final cleaning prior to requesting inspection for substantial completion.
1. Use only professional cleaners.
 2. Clean to the level of cleanliness that would be expected by a commercial building owner from a janitorial service.
- D. Clean entire project site and grounds.
1. Clean up landscaped areas.
 2. Broom clean paved areas.
 3. Rake smooth all exposed earth surfaces.
 4. Remove snow and ice from building and site accesses.

- E. In spaces to be occupied, remove dirt, stains, and other foreign substances from all accessible surfaces and remove nonpermanent labels.
- F. Remove debris from roofs, gutters, downspouts, and roof drains.
- G. In spaces not normally occupied, remove debris and surface dust and wipe equipment clean, removing excess lubrication, paint, and other foreign substances.
- H. Remove paint and other coatings from permanent labels and from mechanical and electrical equipment nameplates.
- I. Leave the project clean and ready for occupancy.

3.11 PROJECT COMPLETION PROCEDURES

- A. Complete the work, prior to substantial completion, as required to obtain consent to occupancy from the governing authorities.
- B. GC to perform inspection and provide GC punchlist, in MS Word format and listed by room, to Architect prior to Architect/Owner substantial completion inspection. The GC punchlist to include all items yet to be completed. Areas to be inspected are to have final cleaning and in state ready for move in. No exceptions will be made to rush this inspection process.
- C. Arrange for final inspections by governing authorities to be accomplished prior to substantial completion.
 - 1. Obtain certificate of occupancy prior to substantial completion meeting.
- D. GC to make reservations and arrangements at a local restaurant, of the Owner's choosing, to have the substantial completion signing meeting. This can be a breakfast or lunch meeting and meal. GC to include all costs associated with the meal, for all attending the meeting, in the project costs. GC to obtain Owner's preferred restaurant well in advance of meeting. GC to assume a G-rated restaurant of type that will accept the type of people normally attending a construction meeting.
- E. Coordinate arrangements for a final property survey prior to substantial completion. This survey to be provided at the Owner's expense. :
 - 1. Show all significant built features on the site.
 - 2. Show locations and elevations of all new benchmarks.

3. Provide, on the survey, the surveyor's certification that the survey shows the accurate locations of the boundaries and the accurate locations and elevations of existing and new work.
- F. If temporary locking systems differ from permanent locking systems, change over to permanent systems prior to substantial completion.

END OF SECTION 01700

SECTION 01800 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Project record documents consisting of:
 - a. Record drawings.
 - b. Record project manual (specifications).
 - c. Record submittals:
 - (1) Shop drawings.
 - (2) Product data.
 - 2. Exceptions: The following are not required as project record documents:
 - a. Informational submittals.
 - b. Manufacturers' and installers' qualification statements.
 - c. Test reports.
- B. Related Sections:
 - 1. Operation and maintenance data: Elsewhere in Division 1.
 - 2. Warranties: Elsewhere in Division 1.

1.3 SUBMITTALS

- A. Project Record Documents: Submit prior to substantial completion.
 - 1. Record drawings: Submit in form of one set of mylar transparencies. Sepias not permitted.
 - a. Submit original marked-up print set.
 - b. Submit 2 additional opaque print copy sets.
 - c. Sets shall include all drawings, whether changed or not.
 - 2. Other record documents: Submit originals or good quality photocopies.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MAINTENANCE OF PROJECT RECORD DOCUMENTS

- A. Do not use record documents of any type for construction purposes.
- B. Maintain record documents in a secure location at the site while providing for access by the contractor and the architect during normal working hours; store in a fire-resistive room or container outside of normal working hours.
- C. Record information as soon as possible after it is obtained.
- D. Assign a person or persons responsible for maintaining record documents.
- E. Record the following types of information on all applicable record documents:
 - 1. Dimensional changes.
 - 2. New and revised details.
 - 3. Depths of foundations.
 - 4. Locations and depths of underground utilities.
 - 5. Actual routings of piping and conduits.
 - 6. Revisions to electrical circuits.
 - 7. Actual equipment locations.
 - 8. Sizes and routings of ducts.
 - 9. Locations of utilities concealed in construction.
 - 10. Particulars on concealed products which will not be easy to identify later.
 - 11. Changes made by modifications to the contract; note identification numbers if applicable.
 - 12. New information which may be useful to the owner, but which was not shown in either the contract documents or submittals.

3.2 RECORD DRAWINGS

- A. Maintain a complete set of opaque prints of the contract drawings, marked to show changes.
- B. Where the actual work differs from that shown on the drawings, mark this set to show the actual work.
 - 1. Mark location of concealed items before they are covered by other work.

2. Mark either record contract drawings or shop drawings, whichever are best suited to show the change.
 3. Where changes are marked on record shop drawings, mark cross-reference on the applicable contract drawing.
- C. When the contractor is required by a provision of a modification to prepare a new drawing, rather than to revise existing drawings, obtain instructions from the architect as to the drawing scale and information required.
- D. Keep drawings in labelled, bound sets.
1. Mark with red pencil.
 2. Mark work of separate contracts with different colors of pencils.
 3. Incorporate new drawings into existing sets, as they are issued.
- E. Review completed record set with the architect.
- F. Upon authorization by the architect, prepare a full set of transparencies of contract drawings with all record changes marked.
- G. The architect will make the original contract drawings available to the contractor for printing transparencies.
- H. Where record drawings are also required as part of operation and maintenance data submittals, make copies from the original record drawing set.

3.3 RECORD PROJECT MANUAL

- A. Maintain a complete copy of the project manual, marked to show changes.
- B. Where the actual work differs from that shown in the project manual, mark the record copy to show the actual work.
1. Include a copy of each addendum and modification to the contract.
 2. In addition to the types of information required on all record documents, record the following types of information:
 - a. Product options taken, when the specification allows more than one.
 - b. Product substitutions.
 - c. Proprietary name and model number of actual products furnished, for each product, material, and item of equipment specified.
 - d. Name of the supplier and installer, for each product for which neither a product data submittal nor a maintenance data submittal was specified.

3.4 RECORD SUBMITTALS

- A. Maintain a complete set of all submittals made during construction, marked to show changes.
 - 1. Maintain submittals in cardboard file boxes, labeled to show contents.
 - 2. Sort submittals by applicable specification section and file in order of submittal identification number.
- B. Record Shop Drawings: Record the types of information specified for all record documents.
 - 1. Mark changes on record shop drawings only when contract drawing would not be capable of showing the change clearly or completely.
 - 2. Mark changes in manner specified for record drawings.
- C. Record Product Data Submittals: Record the types of information specified for all record documents.
 - 1. In addition, record the following types of information:
 - a. Changes in the products as delivered to the site.
 - b. Changes in manufacturer's instructions or recommendations for installation.

3.5 TRANSMITTAL TO OWNER

- A. Collect, organize, label, and package ready for reference.
 - 1. Provide cardboard file boxes for submittals.
 - 2. Provide cardboard drawing tubes with end caps for transparencies.
 - 3. Bind print sets with durable paper covers.
 - 4. Label each document (and each sheet of drawings) with "PROJECT RECORD DOCUMENTS - This document has been prepared using information furnished by ____" [insert the contractor's name], and the date of preparation.
- B. Submit to the architect for transmittal to the owner, unless otherwise indicated.

END OF SECTION 01800

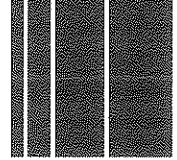
DIVISION 2

Site Work



GEOTECHNICAL DATA





Report on Final Design Subsurface and Foundation Investigation

Proposed Village at Ocean Gate Portland, Maine

for

The Village at Ocean Gate, LLC
c/o Atlas Investment Group, LLC
10 High Street
Boston, MA 02110

October 3, 2007

October 3, 2007
05109

Mr. Demetri Dasco, Managing Partner
The Village at Ocean Gate, LLC
c/o Atlas Investment Group, LLC
10 High Street
Boston, MA 02110

Report on Final Design Subsurface and Foundation Investigation
Proposed Village at Ocean Gate, Portland, Maine

Dear Demetri:

This report presents the results of our final design subsurface and foundation investigation for the proposed Village at Ocean Gate project in Portland, Maine. Foundation recommendations are limited to proposed Buildings 1 and 2 that make up Phase I only. Phase II, located along the northwestern side of Newbury Street, was not approved and the design is pending.

In summary, it is our opinion that the structure may be founded on spread and continuous footings bearing on undisturbed, naturally deposited soil in the northern portion of the building, or on soil improved by a process known as rammed aggregate piers at locations in the southern portion of the building. In addition, an earth-supported bituminous pavement may be used for the lowest level (parking level). Specific recommendations regarding foundation design and construction considerations are presented below.

Introduction

The Village at Ocean Gate will be developed on the site of the Village Café located at 112 Newbury Street. The area for proposed redevelopment is bound approximately by Middle Street, Hancock Street, Newbury Street and midway between Hancock and India Streets. The Village Café building will be removed to allow the new development. We understand that this Phase 1 of the development will include one level of underground parking between Newbury Street and Middle Street with two four-story, wood-framed residential buildings and courtyard above the parking. Existing ground surface elevations within the Phase I area vary from approximately El. 28 to El. 41.

The lowest level, with a plan area of approximately 42,000 square feet, will consist of retail and building entrances along Middle Street, with parking occupying the remainder of the lowest level. The retail areas will have floor levels at approximately El. 27. The garage entrance at Middle Street is at approximately El. 27 and ramps to approximately El. 33.3 at Newbury Street. Floor levels will be at or near existing grade near Middle Street, but will

require excavations of up to 11 feet below Newbury Street. Columns will have variable spacing, and column loads vary from approximately 76 kips in the retail area to 370 kips in the residential area. The residential buildings will have plan areas of approximately 16,800 square feet, with the lowest level at the courtyard at approximately El. 44.

Subsurface Explorations

Preliminary Borings

During the period June 20 to 21, 2005 Maine Test Borings, Inc. (MTB) of Brewer, Maine, drilled six borings, B1 to B6, at locations shown on Sheet 1, Subsurface Exploration Plan. MTB drilled the borings to depths below ground surface varying from 29.2 feet to 32.0 feet. Sebago Technics, Inc. monitored the borings and prepared the logs included in Appendix A. Table I summarizes the results of borings. MTB backfilled the borings with the excavated soil.

Borings were drilled using 2.5 inch inside diameter hollow stem augers. Soil samples were generally taken at 5-foot intervals. Standard Penetration Resistance (N) was measured at each sample interval in accordance with ASTM Test D1586. Undrained shear strength of the clay stratum was measured at various depths by field vane shear tests.

Sebago Technics determined the locations of borings by pacing from existing site features. We determined the ground surface elevations at borings by linear interpolation between the City of Portland ground surface contours at the plotted locations.

Final Design Borings

During the period December 21, 2005 to January 5, 2006, MTB drilled eight borings, B101 to B105 and B107 to B109, at locations shown on Sheet 1. MTB drilled the borings to depths below ground surface varying from 20.0 feet to 42.0 feet. Sebago Technics, Inc. monitored the borings and prepared the logs included in Appendix B. Table I summarizes the results of borings. MTB backfilled the borings with the excavated soil.

Boring B101 was drilled using 4-inch inside diameter flush joint casing. Two 3-inch diameter thin wall samples by stationary piston method were recovered. The remaining borings were drilled using 2.5-inch and 3.375-inch inside diameter hollow stem augers. Soil samples were generally taken at 5-foot intervals. Standard Penetration Resistance (N) was measured at each sample interval in accordance with ASTM Test D1586. Undrained shear strength of the clay stratum was measured at various depths by field vane shear tests. Groundwater observation wells were installed in completed borings B102 and B109.

Sebago Technics determined the locations of borings by pacing and taping from existing site features. We determined the ground surface elevations at borings by linear interpolation between the ground surface contours at the plotted locations.

The boring logs and related information depict the subsurface conditions and water levels encountered at the locations and during the times indicated on the logs. Subsurface conditions at other locations may differ from those encountered in the borings. The passage of time may result in a change in groundwater conditions at the exploration.

Subsurface Conditions

The borings encountered six principal soil units at the site overlying bedrock: fill, upper marine sand, marine silt, marine clay, lower marine sand and glacial till. Encountered thickness and generalized descriptions of the strata encountered are presented below in order of increasing depth below ground surface. Due to the complexity of the deposition process, strata thickness will vary and may be absent at specific locations.

Fill – Fill consists of loose to very dense, brown well-graded SAND with gravel (SW); to brown to black silty SAND (SM), with various amounts of brick, ash, wood and glass. Encountered thickness varies from 1.3 feet to 6.6 feet.

Sand – The upper layer of marine sand consists of very loose to dense, brown to gray silty SAND (SM); to poorly-graded SAND (SP). Encountered thickness varies from 1.3 feet to 17.8 feet.

Silt – Marine silt consists of soft to medium stiff, gray SILT (ML). Encountered thickness varies from 8.0 feet to 10.0 feet.

Clay – Marine clay consists of soft to stiff, gray brown to gray lean CLAY (CL) with frequent sand layers and seams. Undrained shear strength of the lower portion, measured by field vane shear tests, varied from 260 pounds per square feet (psf) to 820 psf. Undrained shear strength of the upper portion, based on correlations with N values, likely varies from 1,000 to 2,000 psf. Encountered thickness varies from 5.5 feet to 24.8 feet.

Sand – The lower marine sand consists of very loose to very dense, gray to brown silty SAND (SM); to poorly-graded SAND (SP) with occasional silt seams. Encountered thickness varies from 2.6 feet to 8.9 feet.

Glacial Till – Glacial till consists of loose to very dense, gray silty SAND with gravel (SM); to well-graded SAND (SW) with cobbles and boulders. Encountered thickness varies from 0.7 foot to greater than 35.5 feet.

Borings B2, B4, B6, B101, B105, B107 and B109 encountered refusal judged to be bedrock at depths below ground surface varying from 29.2 feet to 41.1 feet.

Water was observed in the borings at depths below ground surface varying from 7.0 feet to 18.5 feet. Water levels in the groundwater observation wells in B102 and B109 varied from 2.6 feet to 3.3 feet below ground surface (equivalent elevations varied from El. 25.9 to El. 34.2, respectively). Observations of water were made over a relatively short period of time and may not reflect the stabilized groundwater level. In addition, water levels at the site will vary with season, precipitation, temperature and construction activity in the area. Therefore, water levels during and following construction may vary from those observed in the borings.

Strength and Compressibility Characteristics of Clay Stratum

We estimated the stress history of the clay deposit by correlations with strength ratio, the ratio of shear strength to overburden stress, of similar clays in the area. The undrained shear strength of the lower portion of the clay stratum was measured in borings using field vane shear tests. Measured shear strength varies from 260 psf to 820 psf. The undrained shear strength of the upper portion of the deposit was estimated to be as high as 2,000 psf. The stress history of the deposit was estimated by comparing the strength ratio with correlations of strength ratio and stress history of clay from other projects with similar conditions. The estimated stress history is shown in Figure 1.

The stress history and appropriate compression ratios were estimated for the clay deposit as discussed above. The correlations indicate that the deposit is moderately overconsolidated; that is, the existing overburden stress is at least 1,000 psf less than the maximum previous stress in the lower portion of the clay and more than 3,000 psf near the top. The deposit likely became overconsolidated due to desiccation (drying) resulting from a lowering of the groundwater level at some time in the geologic past which created a stiff upper crust and also increased the effective overburden stress throughout the stratum.

The stress-strain or compressibility characteristics (settlement) of clays are highly dependent upon their stress history. If clay is stressed within the limits of the maximum previous stress, σ_{vm} , the strain (settlement) will be a function of the recompression ratio (RR) of the clay. If the applied stress exceeds the maximum previous stress, the strain will be proportional to the virgin compression ratio (CR). The compression ratio is typically 10 to 15 times the recompression ratio.

Recommendations for Foundation Design

Recommended Foundation Type and Design Criteria

The existing fill is not considered suitable for support of the building foundations. All fill within the limits of the building foundations should be excavated and replaced with non-woven geotextile fabric and ¾-inch crushed stone. We recommend that the building be supported on spread and continuous footings bearing on the undisturbed, naturally deposited soils that have been over excavated and protected by 3-inch thick lean concrete mud mats or non-woven geotextile fabric and a minimum 6-inch thickness of ¾-inch crushed stone. The geotextile fabric should have a minimum weight of 6 ounces per square yard. Columns and foundation walls in the southern portion of the building should be supported on soil that has been improved by rammed aggregate piers.

Footings should be proportioned for an allowable bearing stress in pounds per square foot (psf) equal to 3,000 psf. All footings should be a minimum of 2.0 feet wide.

Exterior footings should be founded at least 4.5 feet below the lowest adjacent ground surface exposed to freezing. Interior footings, if they are located in areas not subject to freezing temperatures, should be founded a minimum of 1.5 feet below the ground floor. If the garage is exposed to freezing temperatures, footings should be founded at least 4 feet below the ground floor.

In order to consider foundations bearing above the clay stratum, we estimated the settlement of the clay resulting from the increased stress from the building loads. We estimate that the total settlement of the northern half of the building will vary from 0.3 inch to 1.0 inch due to the compensation for the weight of the building with soil excavated for the parking level. We estimate that the total settlement in the southern half of the building will vary from 1.0 inch to 2.5 inches due to the lack of compensation for the building weight. We anticipate that settlement in the northern half of the building is acceptable. We recommend that the clay below the columns and wall footings in the southern half of the building, except in retail areas where foundation walls are limited to depth of freezing, be improved with the installation of rammed aggregate piers as installed by Geopier Foundation Company (Geopier). We recommend that Geopier design a system that will limit settlement below columns and walls to less than 1.0 inch. We anticipate that settlement of this magnitude is acceptable. However, JSN Associates, Inc. should determine final acceptability of settlement.

Ground Floor Slabs

We understand that most of the lowest level floor will consist of bituminous concrete for parking. The remainder of the lowest level will consist of retail, restaurant operations and building entrances, lobbies, elevators and stairs. We recommend that the lowest level floor slabs in these areas be designed as earth-supported slabs-on-grade, and the parking areas be designed as bituminous concrete pavement, bearing on a minimum of 12 inches of $\frac{3}{4}$ -inch crushed stone underlain by non-woven geotextile fabric. The geotextile fabric should have a minimum weight of 6 ounces per square yard. Borings indicate that the existing fill consists primarily of well-graded sand to silty sand with various amounts of brick, ash, wood and glass. In our opinion, the existing fill is suitable for support of the slabs following proofrolling, as discussed below. Any soft or yielding areas encountered during proofrolling should be excavated and replaced with fabric and $\frac{3}{4}$ -inch crushed stone. Normal dampproofing and vapor barriers should be provided below the slabs.

We recommend that the pavement for the lowest level parking consist of 3 inches of bituminous concrete, placed in two layers.

We recommend that a perimeter foundation drain and under slab drain system be constructed in the building. The perimeter foundation drain should be constructed on the outside of the foundation walls and an underslab drain below the basement slab. Drains should consist of 4-inch diameter perforated pipe surrounded by $\frac{3}{4}$ -inch crushed stone and non-woven geotextile filter fabric. The invert of the foundation drains should be below the basement floor level and the underslab drain should include a loop around the perimeter of the slab and several cross-laterals to provide multiple paths for water flow. Gravity discharge and normal dampproofing and vapor barriers should be provided for the slabs and basement walls. A device to prevent backflow and a provision for pump discharge should be provide for gravity discharge in the event that water rises above the discharge invert level.

If gravity discharge is not available, discharge from the system may be accomplished by pumping. In order to provide for backup discharge, the system should be designed to pump from two sumps, one at each end of the lower ends of the basement, with standby pumps and emergency electric power available in the event of a power failure. We recommend that the discharge from each sump be designed for a flow of 50 gallons per minute.

Seismic Design Considerations

We recommend that the building be designed in accordance with the seismic requirements of the latest edition of the International Building Code; the site classification is Class D based on a calculation of the weighted average of overburden in the top 100 feet of the site; the site response coefficient F_a is 1.5 for a short period spectral response acceleration S_s of 0.375g; the site response coefficient F_v is 2.4 for the 1-second period spectral response acceleration S_1 of 0.10g. The subgrade soils are not considered liquefaction susceptible.

Lateral Foundation Loads

We recommend that lateral loads be resisted by bottom friction on footings and that a coefficient of friction equal to 0.35 be used for footings. If this does not provide sufficient lateral resistance, we will consider the problem in more detail to take into account other factors.

Lateral Soil Pressure

We recommend that basement walls which are restrained at the top and backfilled be designed to resist a lateral earth pressure calculated on the basis of an equivalent fluid unit weight of 55 pounds per cubic foot. This fluid unit weight assumes an at rest earth pressure coefficient of 0.45, a free-draining granular backfill, and an effective drainage system.

Backfill Materials

Structural fill used for backfill adjacent to walls should consist of sandy gravel to gravelly sand. It should be free of organic material, loam, trash, snow, ice, frozen soil and other objectionable material, and should conform to the following gradation:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
3 inches	100
No. 4	30 to 90
No. 40	10 to 50
No. 200	0 to 8

Compacted structural fill should be placed in layers not exceeding eight inches in loose measure and compacted by self-propelled vibratory equipment at the approximate optimum moisture content to a dry density of at least 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557. In confined areas, the loose layer thickness should be reduced to 6 inches and compaction performed by hand-guided vibratory equipment.

Compacted structural fill on the exterior of the foundation and basement walls should extend laterally a minimum of 2 feet from the wall. Backfill beyond this limit on the exterior of the building may consist of common fill. The top 12 inches of fill on the exterior of the building should consist of low permeability material or sidewalk pavement to minimize water infiltration next to the building. Grading should provide for runoff away from the building.

Common fill may consist of inorganic mineral soil that can be placed in layers and compacted. Common fill should be placed and spread in layers not exceeding 12 inches in thickness and compacted at the approximate optimum moisture content to a dry density of at least 92 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557.

Construction Considerations

General

The primary purpose of this section of the report is to comment on items related to excavation, earthwork, and related geotechnical aspects of proposed construction. It is written primarily for the engineer having responsibility for preparation of plans and specifications. Since it identifies potential construction problems related to foundations and earthwork, it will also aid personnel who monitor the construction activity. Prospective contractors for this project must evaluate the construction problems on the basis of their own knowledge and experience in the Portland, Maine area, and on the basis of similar projects in other localities, taking into account their proposed construction methods, procedures, equipment and personnel.

Excavation, Lateral Support and Control of Water

Due to the proximity of city streets and adjacent buildings, foundation excavation for the lowest level floor, and foundations in approximately the northern half of the building, a temporary earth support system will be required. Excavations up to 11 feet below street level will be required along Newbury Street, portions of Hancock Street, and the west side of the project. Lateral support schemes that may be considered by the contractor include interlocking steel sheeting and soldier beams. We anticipate that internal lateral bracing may be required due to anticipated restrictions on installing external support such as tiebacks, which would extend below the city streets and adjacent buildings.

The temporary excavation support system must provide lateral support of the excavation, prevent damage to adjacent buildings, streets and utilities, and be designed to the following criteria:

1. Position the highest brace no deeper than 6 feet below existing exterior grade.
2. Excavation should not proceed more than 2 feet below any bracing level prior to the installation and loading of the brace.
3. Maintain the maximum cumulative horizontal movement at any point along the temporary excavation support walls to less than 1.5 inches.
4. Maintain the maximum vertical movement of any buildings to less than 0.75 inch; any utilities and streets to less than 1.0 inch.

If any of the above movement limits are exceeded, the contractor should immediately submit and implement a Movement Mitigation Plan. The plan may include additional vertical and horizontal supports or other measures. The contractor should demonstrate that the proposed measures can be implemented immediately, if required, to prevent damage to the adjacent buildings and streets and utilities.

Based on observed groundwater levels in borings and observation wells, dewatering will be required during excavation and foundation construction and until the permanent perimeter foundation and underslab drain system is operational. Based on the water levels observed, groundwater is likely perched in the fill and sand deposit above the clay stratum and is present in the sand and glacial till below the clay stratum. Perched groundwater may be as much as 3 to 4 feet above the lowest excavation level. Subsurface data indicate that excavation will be made in sand, silt and clay. In our opinion, dewatering and control of water from other sources can likely be controlled by sumps with open pumping. Dewatering must be done in a manner which will preserve the undisturbed bearing capacity of the bearing soils and permit construction "in-the-dry." Sumps and pumps should be installed with adequate filters to minimize loss of fine-grained soil.

We recommend that the contractor's proposed methods for making and dewatering the excavation be designed by a licensed professional engineer and the scheme submitted to the owner's engineer for review and comment prior to installation.

Subgrade Preparation

The subgrade soil is susceptible to disturbance from construction traffic. Equipment and personnel should not be permitted to travel across exposed footing bearing surfaces or exposed slab subgrades. As discussed above, we recommend that footing bearing surfaces be protected with 3-inch thick lean concrete mudmats or non-woven geotextile fabric and 6-inch thickness of $\frac{3}{4}$ -inch crushed stone. Slab subgrade surfaces should be protected with non-woven geotextile fabric and 12-inch thickness of $\frac{3}{4}$ -inch crushed stone. Any subgrade areas that are disturbed should be recompacted or excavated and replaced with crushed stone prior to placing mudmats or crushed stone. Subgrades should be protected against freezing temperatures if exposed during construction. Final excavation to subgrade should be performed using equipment with smooth-edge buckets.

Limitations of Recommendations

This report has been prepared for specific application to the subject project in accordance with generally accepted geotechnical engineering practices. In the event that any changes in the nature, design or location of the structure are planned, the conclusions and recommendations contained in this report should not be considered valid, unless the changes are reviewed and the conclusions of this report modified or verified in writing.


The recommendations presented herein are based in part upon the data obtained from the referenced borings. The nature and extent of variations from that disclosed by the borings may not become evident until construction. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report.

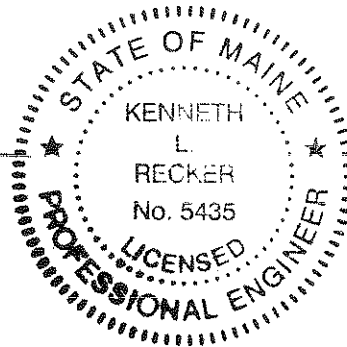
We request that we be provided the opportunity for a general review of final design and specifications in order to determine that our earthwork and foundation recommendations have been interpreted and implemented in the design and specifications as they were intended.

It has been a pleasure to work with you on this project. Please do not hesitate to contact us if you have any questions or need additional information.

Sincerely,

SEBAGO TECHNICS, INC.


Kenneth L. Recker, P.E.
Geotechnical Engineering Manager



KLR:KLR/JC
Enclosures:

- Table I - Summary of Borings
- Sheet 1 - Subsurface Exploration Plan
- Figure 1 - Stress History Phase I
- Appendix A - Logs of Preliminary Borings
- Appendix B - Logs of Final Design Borings

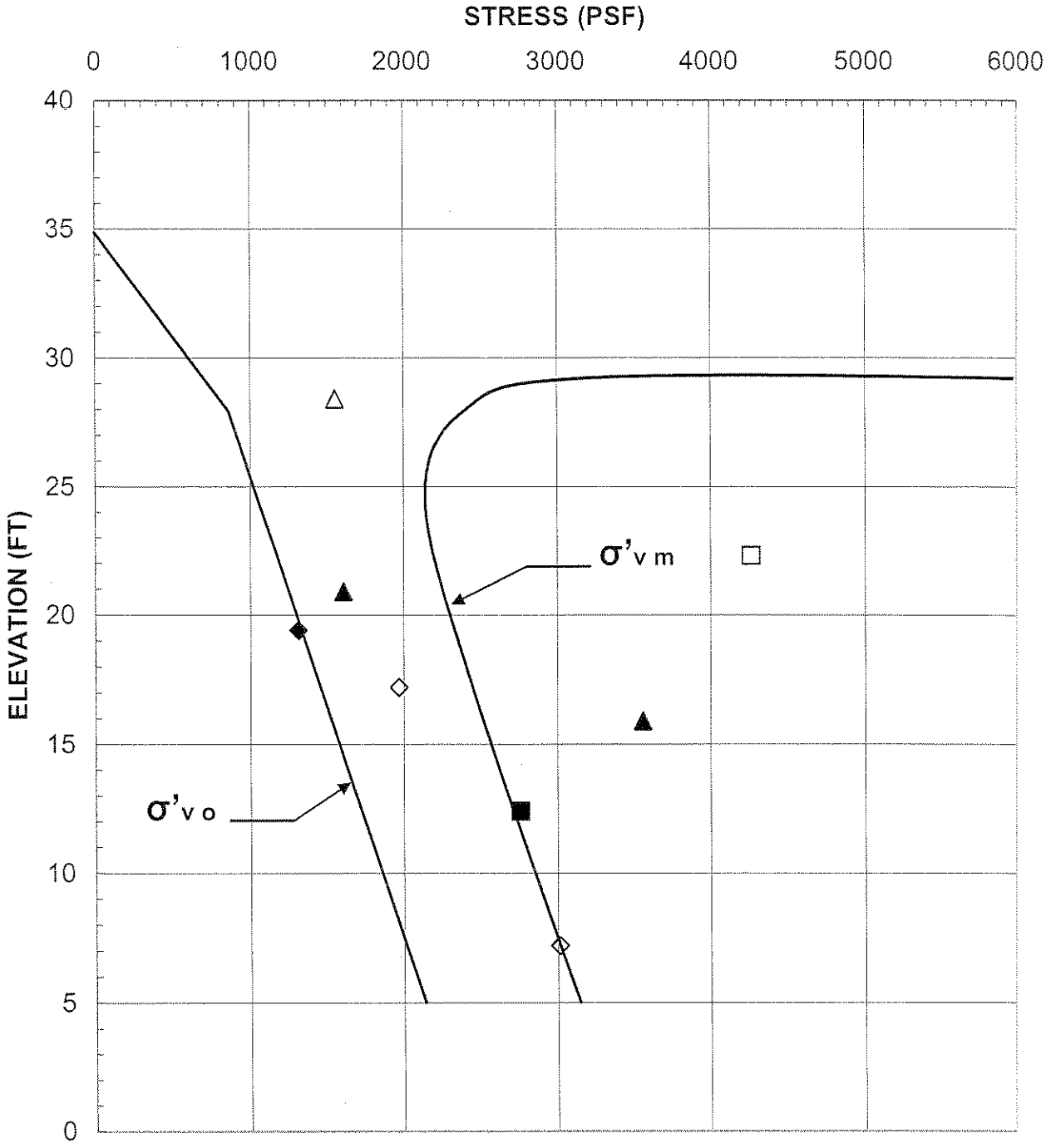
TABLE I
SUMMARY OF BORINGS
PROPOSED VILLAGE AT OCEAN GATE
PORTLAND, MAINE

Boring Number	Depth (ft)	Approx. Gnd. Sur. El. (Ft)	Depth to Water (Ft)	Strata Thickness (Ft)							Bedrock
				Fill	Marine Deposits			Glacial Till	Bedrock		
					Upper Sand	Silt	Clay			Lower Sand	
B101	30.6	34.2	7.2	3.0	--	20.7	3.5	3.3	0.1*		
B102	32.0	28.5	2.6	4.0	2.4	14.6	8.9	1.6*	--		
B103	20.0	34.1	6.0	6.3	--	11.0	2.7*	--	--		
B104	42.0	29.0	7.8	5.2	1.3	--	--	35.5*	--		
B105	24.0	39.5	8.0	2.0	--	17.0	2.6	2.4	0.0*		
B107	41.1	44.1	7.0	6.6	4.9	24.8	3.7	1.1	0.0*		
B108	40.0	49.2		3.0	17.8	15.2	4.0*	--	--		
B109	21.4	38.5	3.3	1.2	--	15.6	3.7	0.9	0.0*		
B1	32.0	40.7	7.0	3.5	7.0	13.5*	8.0	--	--		
B2	30.1	35.6	11.3	4.0	--	17.0	5.9	3.2	0.0*		
B3	32.0	28.8	10.9	3.3	--	18.2	4.5	6.0*	--		
B4	30.7	39.9	10.0	3.0	3.0	20.0	4.0	0.7	0.0*		
B5	32.0	47.5	11.3	1.3	7.2	14.5	6.0	3.0*	--		
B6	29.2	42.2	9.8	1.3	2.2	5.5	7.3	2.9	0.0*		

NOTES:

1. -- INDICATES STRATUM NOT ENCOUNTERED WITHIN DEPTH OF BORING.
2. * INDICATES DEPTH OF PENETRATION INTO STRATUM.

STRESS HISTORY VILLAGE AT OCEAN GATE, PH I PORTLAND, MAINE



◆ B2 ■ B3 ▲ B101 ◇ B102 □ B103 △ B105

FIGURE 1

Appendix A

Logs of Preliminary Borings

TEST BORING REPORT

PROJECT	VILLAGE CAFE REDEVELOPMENT	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	6/20/2005
DRILLER	B. ENOS	DATE FINISHED	6/20/2005

Elevation	40.7	ft.	Datum	Boring Location	See Plan
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobil B53
Type	HSA	SS	--	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head <input checked="" type="checkbox"/> Safety
Inside Diameter (in.)	2.5	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch <input type="checkbox"/> Doughnut
Hammer Weight (lb.)	--	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit <input checked="" type="checkbox"/> Automatic
Hammer Fall (in.)	--	30		<input type="checkbox"/> Skid <input type="checkbox"/>	<input checked="" type="checkbox"/> Cutting Head

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color; GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0					0.2		-BITUMINOUS CONCRETE-													
7	S1	0.3			1.0	SW	Medium dense, brown well-graded SAND with gravel (SW), mps = 1.3 in., dry	10	10	30	25	20	5							
12					1.2		-FILL-													
13	10	2.3			1.2	SM	Medium dense, red BRICK, dry													
					3.5		Medium dense, black silty SAND (SM), mps = 0.1 in., dry					5	80	15						
							-FILL-													
							Note: gray sandy silt in auger cuttings at 3.5 ft.													
5																				
2	S2	5.0				SM	Very loose, gray silty SAND (SM), frequent silt seams, mps = 0.02 in., wet						80	20						
2																				
1																				
1	15	7.0																		
							-MARINE DEPOSITS-													
10																				
1	S3	10.0			10.5	SW	Very loose, gray well-graded SAND (SW), mps = 0.2 in., wet	10	40	45	5									
	WOH					ML	Soft, gray SILT (ML), frequent sand partings, mps = 0.02 in., wet					15	85			L	N			
	16	12.0																		
							-MARINE DEPOSITS-													
15																				
1	S4	15.0				ML	Soft, gray SILT (ML), frequent sand seams, mps = 0.02 in., trace clay, wet					20	80			L	N			
	WOH																			
	24	17.0																		
							-MARINE DEPOSITS-													
20																				
1	S5	20.0				CL	Soft, gray lean CLAY (CL), frequent sand partings to seams, mps = 0.02 in., wet					15	85			N	M	M		
	WOH																			
	24	22.0																		
							-MARINE DEPOSITS-													
25																				
	S6	25.0				CL	Soft, gray lean CLAY (CL), frequent sand seams, mps = 0.2 in., wet	5	10	15	75			N	M	M				
	WOH																			
	12	27.0																		
							-MARINE DEPOSITS-													

Water Level Data				Sample ID		Well Diagram		Summary		
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	<input type="checkbox"/>	Riser Pipe	Overburden (Linear ft.)	32.0
			Bottom of Casing	Bottom of Hole	Water					
6/20/2005	1212		Caved	9.8	7.0	U	<input type="checkbox"/>	Filter Sand	Number of Samples	75
						S	<input type="checkbox"/>	Cuttings	BORING NO. B1	
						G	<input type="checkbox"/>	Grout		
						FV	<input type="checkbox"/>	Concrete		
							<input type="checkbox"/>	Bentonite Seal		

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
30	WOR i	S7	30.0			CL	Soft, gray lean CLAY (CL), frequent fine sand seams, mps = 0.1 in., wet				5	15	80	N	M	M	
	WOH j	24	32.0				-MARINE DEPOSITS-										
Bottom of exploration at 32.0 ft. below ground surface																	
No refusal																	
35																	
40																	
45																	
50																	
55																	
60																	
65																	
70																	

PROJECT: VILLAGE CAFE REDEVELOPMENT STI JOB NO. 05109
 LOCATION: NEWBURY STREET, PORTLAND, MAINE PROJECT MGR. C. DIMATTEO
 CLIENT: GPI ACQUISITIONS I, LLC FIELD REP. K. B. STEPHENSON
 CONTRACTOR: MAINE TEST BORINGS, INC. DATE STARTED 6/20/2005
 DRILLER: B. ENOS DATE FINISHED 6/20/2005

Elevation	35.6	ft	Datum	Boring Location	See Plan
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobil B53
Type	HSA	SS	--	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	2.5	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch
Hammer Weight (lb.)	--	140	--	<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	--	30	--	<input type="checkbox"/> Skid <input type="checkbox"/>	<input checked="" type="checkbox"/> Cutting Head
Hammer Type: <input checked="" type="checkbox"/> Safety <input type="checkbox"/> Bentonite <input type="checkbox"/> Doughnut <input type="checkbox"/> Polymer <input type="checkbox"/> Automatic <input checked="" type="checkbox"/> None					
Drilling Mud: <input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None					
Casing Advance: HSA/SPIN/30.0					
Drilling Notes: 2.8 x 7.0 in. Field Vane					

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0					0.2		-BITUMINOUS CONCRETE-													
	3	S1	0.3		0.8	SW	Loose, brown well-graded SAND (SW), mps = 0.2 in., dry			30	40	25	5							
	2					SM	Loose, dark brown silty SAND (SM), mps = 0.2 in., traces brick, glass, ash, damp			20	15	15	15							
					4.0		-FILL-													
5						CL	Stiff, gray-brown mottled lean CLAY (CL), damp							100	N	M	M			
	2	S2	5.0																	
	4																			
	6																			
	7	24	7.0																	
							-MARINE DEPOSITS-													
					8.5															
10						CL	Soft, gray lean CLAY (CL), occasional sand seams, mps = 0.02 in., wet					5	95	N	M	M				
	WOH	S3	10.0																	
	WOH																			
	2	24	12.0																	
							-MARINE DEPOSITS-													
15						CL	FVI from 15.0 to 15.6 ft. = 7/3 ft. lb., Su = 260 psf					5	95	N	M	M				
	WOR	FV1	15.0-15.6																	
	WOH	S4	15.0				Soft, gray CLAY (CL), occasional sand partings, mps = 0.02 in., wet													
	WOH																			
	2	24	17.0																	
							-MARINE DEPOSITS-													
20						CL	Soft, gray lean CLAY (CL), frequent sand seams, mps = 0.02 in., wet					10	90	N	M	M				
	WOR	S5	20.0		21.0															
	WOR																			
	WOH					SM	Very loose, gray silty SAND (SM), frequent clay seams, mps = 0.02 in., wet					80	20							
	WOH	24	22.0																	
							-MARINE DEPOSITS-													
25						SP	Very loose, gray poorly-graded SAND (SP), occasional silt seams, mps = 0.02 in., wet					95	5							
	WOR	S6	25.0																	
	1																			
	WOH																			
	5	10	27.0		26.9															
							-MARINE DEPOSITS-													
							-GLACIAL TILL DEPOSITS-													

Water Level Data			Depth in feet to:			Sample ID		Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Bottom of Casing	Bottom of Hole	Water	O	U	T	S	G	Field Tests
6/21/2005	0840		Caved	19.0	11.3	Open End Rod	Undisturbed Sample	Thin Wall Tube	Split Spoon Sample	Geoprobe	Dilatancy: R - Rapid S - Slow N - None
						Field Vane	Geoprobe	Concrete	Bentonite Seal	Toughness: L - Low M - Medium H - High	
											Plasticity: N - Nonplastic L - Low M - Medium H - High
											Dry Strength: N - None L - Low M - Medium H - High V - Very High
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.											
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.											

TEST BORING REPORT

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test					
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength	
30	S07.1	S7 2	30.0 30.1		30.1	SM	Very dense, gray silty SAND (SM), mps = 1.0 in., wet -GLACIAL TILL DEPOSITS-	5		10	10	60	15					
							Split spoon refusal at 30.1 ft. on probable bedrock Bottom of exploration at 30.1 ft. below ground surface											
35																		
40																		
45																		
50																		
55																		
60																		
65																		
70																		

NOTES:

FILE NO.

05109

BORING NO.

B2

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

TEST BORING REPORT

PROJECT	VILLAGE CAFE REDEVELOPMENT	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	6/21/2005
DRILLER	B. ENOS	DATE FINISHED	6/21/2005

Elevation	28.8	ft.	Datum	Boring Location	See Plan
Type	HSA	Sampler	SS	Core Barrel	--
Inside Diameter (in.)	2.5	1.375	--	Rig Make & Model	Mobil B53
Hammer Weight (lb.)	--	140	--	Hammer Type	<input checked="" type="checkbox"/> Safety <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic
Hammer Fall (in.)	--	30	--	Drilling Mud	<input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None
Drilling Notes: 2.0 x 7.0 Field Vane					

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0					0.2		-BITUMINOUS CONCRETE-													
13		S1	0.3		0.7	SW	Dense, brown well-graded SAND with gravel (SW), mps = 1.3 in., dry	10	15	30	30	20	5							
18					1.0		-FILL- Dense, red BRICK, dry													
15							-FILL- Dense, black silty SAND (SM), mps = 0.3 in., traces ash, brick, dry													
12		14	2.3		3.3	SM	-FILL- Note: 7 in. cobble at approximately 1.0 ft. Brown silty sand in auger cuttings from 1.5 to 3.3 ft.													
5																				
6		S2	5.0			CL	Stiff, gray lean CLAY (CL), mps = 0.02 in., damp						5	95	N	M	M			
5																				
5		16	7.0				-MARINE DEPOSITS-													
7																				
10																				
WOH		S3	10.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand partings, mps = 0.02 in., wet						5	95	N	M	M			
WOH																				
WOH		24	12.0				-MARINE DEPOSITS-													
WOH																				
15																				
WOR		FV1	15.0-15.6				FV1 from 15.0 to 15.6 ft. = 177 ft. lb., Su = 630 psi													
WOH		S4	15.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand partings to seams, mps = 0.02 in., wet						10	90	N	M	M			
WOH																				
WOH		24	17.0				-MARINE DEPOSITS-													
20																				
WOH		S5	20.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand seams, three 0.25 in. dropstones at 21.2 ft., wet						15	85	N	M	M			
WOH																				
2					21.5	SP	Very loose, gray poorly-graded SAND (SP), mps = 0.02 in., wet						100							
5		24	22.0				-MARINE DEPOSITS-													
25																				
WOH		S6	25.0			SM	Loose, gray silty SAND (SM), frequent silt seams, mps = 0.1 in., wet						5	80	15					
3					26.0	SM	Loose, gray silty SAND with gravel (SM), mps = 1.3 in., wet						5	10	25	20	25	15		
3																				
4		24	27.0				-GLACIAL TILL-													
30																				

Water Level Data			Sample ID			Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	Riser Pipe	Overburden (Linear ft.)	32.0
			Bottom of Casing	Bottom of Hole	Water				
6/21/2005	7047		Caved	19.8	10.9	U	Filter Sand	Number of Samples	75
						S	Cuttings		
						S	Grout		
						G	Concrete		
						FV	Bentonite Seal		
Field Tests		Dilatancy: R - Rapid S - Slow N - None			Plasticity: N - Nonplastic L - Low M - Medium H - High		BORING NO. B3		
		Toughness: L - Low M - Medium H - High			Dry Strength: N - None L - Low M - Medium H - High V - Very High				
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.									
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.									

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
30	5	S7	30.0			SM	Medium dense, gray silty SAND with gravel (SM), mps = 1.2 in., wet	10	10	30	20	15	15				
	7																
	5																
	8	24	32.0				-GLACIAL TILL DEPOSITS-										
							Bottom of exploration at 32.0 ft. below ground surface No refusal										
35																	
40																	
45																	
50																	
55																	
60																	
65																	
70																	

NOTES:

FILE NO.

05109

BORING NO.

B3

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

PROJECT: VILLAGE CAFE REDEVELOPMENT
 LOCATION: NEWBURY STREET, PORTLAND, MAINE
 CLIENT: GFI ACQUISITIONS I, LLC
 CONTRACTOR: MAINE TEST BORINGS, INC.
 DRILLER: B. ENOS

STI JOB NO. 05109
 PROJECT MGR. C. DIMATTEO
 FIELD REP. K. B. STEPHENSON
 DATE STARTED 6/20/2005
 DATE FINISHED 6/20/2005

Elevation	39.9	ft.	Datum	Boring Location	See Plan
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobil B53
Type	HSA	SS	--	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head
Inside Diameter (in.)	2.5	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input type="checkbox"/> Winch
Hammer Weight (lb.)	--	140	--	<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit
Hammer Fall (in.)	--	30	--	<input type="checkbox"/> Skid <input type="checkbox"/>	<input checked="" type="checkbox"/> Cutting Head
Hammer Type: <input checked="" type="checkbox"/> Safety <input type="checkbox"/> Doughnut <input type="checkbox"/> Automatic					
Drilling Mud: <input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer <input checked="" type="checkbox"/> None					
Casing Advance: HSA/SPIN/30.0					
Drilling Notes: 2.0 x 7.0 in. Field Vane					

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0	9	S1	0.0		0.4	SM	Very dense, brown silty SAND with gravel (SM), mps = 1.2 in., dry	10	5	30	20	20	15							
	50/4	8	0.9		0.6	SM	Very dense, brown silty SAND with gravel (SM), mps = 1.0 in., damp	10	5	30	20	20	15							
					3.0		-FILL-													
							Note: brown silty sand in auger cuttings at 3.0 ft.													
5	2	S2	5.0		6.0	SM	Loose, brown silty SAND (SM), mps = 0.02 in., wet						85	15						
	2				6.6	CL	MARINE DEPOSITS-													
	3	20	7.0		6.6	CL	Medium stiff, gray-brown mottled lean CLAY (CL), mps = 0.02 in., damp					5	95	N	M	M				
	3					CL	Medium stiff, gray lean CLAY (CL), mps = 0.02 in., wet					5	95	N	M	M				
10	WOR	FV1	10.0-10.6				FV1 from 10.0 to 10.6 ft. = 15/7 ft. lb., Su = 560 psf													
	WOH	S3	10.0			CL	Medium stiff, gray lean CLAY (CL), occasional sand partings, frequent black streaks, mps = 0.02 in., wet					5	95	N	M	M				
	WOH																			
	2	24	12.0																	
							MARINE DEPOSITS-													
15	WOR	S4	15.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand partings and black streaks, mps = 0.02 in., wet					5	95	N	M	M				
	WOH																			
	WOH																			
	2	24	17.0																	
							MARINE DEPOSITS-													
20	2	S5	20.0		20.4	CL	Note: attempted field vane at 20.0 ft. - could not advance vane Medium stiff, gray lean CLAY (CL), frequent sand partings and black streaks, mps = 0.02 in., wet					5	95	N	M	M				
	1					CL	Medium stiff, gray lean CLAY (CL), frequent sand seams, mps = 0.02 in., wet					15	85	N	M	M				
	1	24	22.0																	
					24.0		MARINE DEPOSITS-													
25	WOR	FV2	25.0-25.6				FV2 from 25.0 to 25.6 ft. = 27/10 ft. lb., Su = 1,000 psf													
	WOH	S6	25.0			SM	Very loose, gray silty SAND (SM), frequent clay seams, mps = 0.02 in., wet					80	20							
	WOH																			
	10	27.0																		
							MARINE DEPOSITS-													

Water Level Data			Sample ID			Well Diagram			Summary													
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	T	U	S	G	FV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Overburden (Linear ft.)	Rock Cored (Linear ft.)	Number of Samples		
			Bottom of Casing	Bottom of Hole	Water																	
6/20/2005	1627		Caved	12.0	10.0															30.7	--	75
												BORING NO.			B4							
Field Tests			Dilatancy: R - Rapid S - Slow N - None			Plasticity: N - Nonplastic L - Low M - Medium H - High			Toughness: L - Low M - Medium H - High V - Very High													
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.																						
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.																						

TEST BORING REPORT

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
30	3 50.2	S7 8	30.0 30.7		30.0 30.7	SM	Very dense, gray silty SAND with gravel (SM), mps = 1.0 in., wet -GLACIAL TILL DEPOSITS-	5	10	20	10	40	15				
							Split spoon refusal at 30.7 ft. on probable bedrock Bottom of exploration at 30.7 ft. below ground surface										
35																	
40																	
45																	
50																	
55																	
60																	
65																	
70																	

NOTES:

FILE NO.

05109

BORING NO.

B4

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

PROJECT	VILLAGE CAFE REDEVELOPMENT	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	6/20/2005
DRILLER	B. ENOS	DATE FINISHED	6/20/2005

Elevation	47.5	ft.	Datum		Boring Location	See Plan		
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobil B53	Hammer Type	Drilling Mud	Casing Advance
Type	HSA	SS	--	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> ATV	<input type="checkbox"/> Tripod <input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Cat-Head <input checked="" type="checkbox"/> Winch	<input checked="" type="checkbox"/> Safety <input type="checkbox"/> Doughnut	<input type="checkbox"/> Bentonite <input type="checkbox"/> Polymer
Inside Diameter (in.)	2.5	1.375	--	<input type="checkbox"/> Track <input type="checkbox"/> Skid	<input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit <input checked="" type="checkbox"/> Cutting Head	<input type="checkbox"/> Automatic <input checked="" type="checkbox"/> None	Type Method Depth HSA/SPIN/30.0
Hammer Weight (lb.)	--	140						
Hammer Fall (in.)	--	30						

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Finest	Dilatancy	Toughness	Plasticity	Strength
0					0.15		-BITUMINOUS CONCRETE-										
	3	S1	0.3			SW	Loose, brown well-graded SAND with gravel (SM), mps = 1.2 in., damp	5	10	20	20	45					
	3																
	5				1.3		-FILL-										
	8	14	2.3			SP	Loose, brown poorly-graded SAND (SP), mps = 0.02 in., rusty discolorations, damp						95	5			
							-MARINE DEPOSITS-										
5																	
	4	S2	5.0		5.5	SP-SM	Very loose, brown poorly-graded SAND with silt (SP-SM), mps = 0.02 in., wet						90	10			
	1																
	1					SM	Very loose, gray silty SAND (SM), mps = 0.02 in., occasional silt seams, wet						85	15			
	2	15	7.0				-MARINE DEPOSITS-										
					8.5												
10																	
	WOH	S3	10.0			CL	Medium stiff, gray lean CLAY (CL), occasional black streaks and sand seams, mps = 0.02 in., wet						10	90	N	M	M
	WOH																
	WOH																
	1	24	12.0				-MARINE DEPOSITS-										
15																	
	WOR	FV1	15.0-15.6				FV1 from 15.0 to 15.6 ft. = 20/10 ft. lb., Su = 740 psf										
	WOH	S4	15.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand seams, mps = 0.02 in., wet						10	90	N	M	M
	WOH																
	2	24	17.0				-MARINE DEPOSITS-										
20																	
	WOH	S5	20.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand seams, mps = 0.02 in., wet						15	85	N	M	M
	WOH																
	WOH																
	1	24	22.0				-MARINE DEPOSITS-										
					23.0												
25																	
	WOR	S6	25.0			SP	Very loose, gray poorly-graded SAND (SP), occasional silt seams, mps = 0.1 in., wet						5	85	10		
	1																
	1																
	1	18	27.0				-MARINE DEPOSITS-										
					29.0												
30							-GLACIAL TILL DEPOSITS-										

Water Level Data			Sample ID			Well Diagram			Summary							
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	D	U	S	G	FV	<input type="checkbox"/> Riser Pipe <input type="checkbox"/> Screen <input type="checkbox"/> Filter Sand <input checked="" type="checkbox"/> Cuttings <input type="checkbox"/> Grout <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Bentonite Seal	Overburden (Linear ft.)	Rock Cored (Linear ft.)	Number of Samples	
			Bottom of Casing	Bottom of Hole	Water											32.0
6/20/2005	1820		Caved	17.0	11.3											
													BORING NO.	B5		

Field Tests	Dilatancy: R - Rapid S - Slow N - None	Plasticity: N - Nonplastic L - Low M - Medium H - High
	Toughness: L - Low M - Medium H - High	Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Penetrate	Strength
30	1	S7	30.0			SM	Very loose, gray silty SAND with gravel (SM), mps = 1.0 in., wet	5	10	20	20	30	15				
	1 WOH	24	32.0				-GLACIAL TILL DEPOSITS-										
							Bottom of exploration at 32.0 ft. below ground surface No refusal										
35																	
40																	
45																	
50																	
55																	
60																	
65																	
70																	

NOTES:

FILE NO.

05109

BORING NO.

B5

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil Identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

PROJECT	VILLAGE CAFE REDEVELOPMENT	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	6/20/2005
DRILLER	B. ENOS	DATE FINISHED	6/20/2005

Elevation	42.2	ft.	Datum		Boring Location	See Plan
Item	Casing	Sampler	Core Barrel	Rig Make & Model	See Plan	
Type	HSA	SS	--	<input checked="" type="checkbox"/> Truck <input type="checkbox"/> Tripod		
Inside Diameter (in.)	2.5	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe		
Hammer Weight (lb.)	--	140		<input type="checkbox"/> Track <input type="checkbox"/> Air Track		
Hammer Fall (in.)	--	30		<input type="checkbox"/> Skid <input type="checkbox"/>		

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test						
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Flines	Dilatancy	Toughness	Plasticity	Strength		
0					0.25		CONCRETE.												
	2	S1	0.5		0.8	SW	Loose, brown well-graded SAND (SM), mps = 0.2 in., wet -FILL-			20	40	40							
	5					SW-SM	Loose, gray to black well-graded SAND with silt and gravel (SW-SM), mps = 1.3 in., wet -FILL-	10	10	20	20	30	10						
	4				1.3														
	5	10	2.5			SM	Loose, gray-brown silty SAND (SM), mps = 0.02 in., damp						85	15					
					3.5		-MARINE DEPOSITS-												
5	WOH	S2	5.0			ML	Soft, gray SILT (ML), occasional sand partings, mps = 0.02 in., wet						10	90	L	N			
	WOH																		
	WOH	24	7.0				-MARINE DEPOSITS-												
10	WOH	FV1	10.0-10.6			ML	FV1 from 10.0 to 10.6 ft. = 23/8 ft. lb., Su = 850 psf						15	85	L	N			
	WOH	S3	10.0				Medium stiff, gray SILT (ML), frequent sand seams, mps = 0.02 in., wet												
	WOH																		
	WOH	24	12.0				-MARINE DEPOSITS-												
					13.5														
15	WOH	S4	15.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand layers, 0.75 in. drop-stone at 16.5 ft., wet						40	60	N	M	M		
	WOH																		
	WOH	24	17.0				-MARINE DEPOSITS-												
					19.0														
20	WOH	FV2	20.0-20.6			SM	FV2 from 20.0 to 20.6 ft. = 30/10 ft. lb., Su = 1,110 psf						80	20					
	WOH	S5	20.0				Very loose, gray silty SAND (SM), occasional clay seams, mps = 0.02 in., wet												
	WOH				21.5														
	WOH	24	22.0			SP	Very loose, brown poorly-graded SAND (SP), mps = 0.1 in., wet					5	95						
							-MARINE DEPOSITS-												
25	WOH	S6	25.0			SP	Very loose, gray-brown poorly-graded SAND (SP), mps = 0.1 in., wet					10	90						
	WOH																		
	WOH	24	27.0			SM	Very loose, gray silty SAND (SM), mps = 1.2 in., wet	5	5	20	15	40	15						
							-MARINE DEPOSITS-												
					26.3														
					28.0		-GLACIAL TILL DEPOSITS-												
					29.2		-PROBABLE WEATHERED BEDROCK-												
30							HSA refusal on probable bedrock at 29.2 ft. Bottom of exploration at 29.2 ft. below ground surface												

Water Level Data			Sample ID			Well Diagram			Summary						
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	T	U	S	G	FV	<input type="checkbox"/> Riser Pipe	<input type="checkbox"/> Screen	Overburden (Linear ft.)	28.0
			Bottom of Casing	Bottom of Hole	Water										
6/20/2005	14:19		Caved	19.0	9.8										

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
 Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High
 *NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.
 NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

Appendix B

Logs of Final Design Borings

PROJECT: FINAL DESIGN INVESTIGATION, REDEVELOPMENT OF VILLAGE CAFÉ
 LOCATION: NEWBURY STREET, PORTLAND, MAINE
 CLIENT: GFI ACQUISITIONS I, LLC
 CONTRACTOR: MAINE TEST BORINGS, INC.
 DRILLER: R. IDANO
 STI JOB NO.: 05109
 PROJECT MGR.: C. DIMATTEO
 FIELD REP.: K. B. STEPHENSON
 DATE STARTED: 1/4/2006
 DATE FINISHED: 1/5/2006

Elevation	34.2	ft.	Datum	NGVD 1929	Boring Location	See Plan
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobile B47	Hammer Type
Type	NW	SS	--	<input type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety
Inside Diameter (in.)	4.0	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input type="checkbox"/> Doughnut
Hammer Weight (lb.)	300	140	--	<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Automatic
Hammer Fall (in.)	16	30	--	<input type="checkbox"/> Skid <input checked="" type="checkbox"/> Trailer	<input checked="" type="checkbox"/> Cutting Head	<input checked="" type="checkbox"/> None
Drilling Notes: 2.0 x 7.0 Field Vane						
Casing Advance Type Method Depth NW/DRIVEN/30.0						

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0					0.2		-BITUMINOUS CONCRETE-													
		S1	1.0			SM	Note: augered to 1.1 ft., probable boulder. Moved boring- augered to 1.0 ft. Dense, dark brown silty SAND (SM), mps = 1.0 in., dry	5	5	30	30	15	15							
					3.0		-FILL-													
					4.5		-MARINE DEPOSITS-													
5		NR	5.0				Note: gray-brown clay in wash at 3.0 ft. Note: gray clay in wash at 4.5 ft. No recovery													
							-MARINE DEPOSITS-													
10	HYDR. PUSH	U1	10.0			CL	Gray lean CLAY (CL)													
							-MARINE DEPOSITS-													
	WOR	FV1	12.0-12.6			CL	FV1 from 12.0 to 12.6 ft. = 9/1 ft. lb., Su = 330 psf													
	WOH	S2	12.0			CL	Soft, gray lean CLAY (CL), sand parting at 13.0 ft., mps = 0.02 in., occasional dark streaks, wet								100	N	M	M		
	WOH	24	14.0				-MARINE DEPOSITS-													
15	HYDR. PUSH	U2	15.0			CL	Gray lean CLAY (CL)													
							-MARINE DEPOSITS-													
	WOR	FV2	17.0-17.6			CL	FV2 from 17.0 to 17.6 ft. = 21/5 ft. lb., Su = 780 psf													
	WOR	S3	17.0			CL	Medium stiff, gray lean CLAY (CL), occasional sand partings, 1 in. dropstone at 17.2 ft., wet								5	95	N	M	M	
	WOH	24	19.0				-MARINE DEPOSITS-													
20	WOR	S4	20.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand partings to seams, mps = 0.02 in., wet								15	85	N	M	M	
	WOH						-MARINE DEPOSITS-													
	WOH	7	22.0				-MARINE DEPOSITS-													
							-MARINE DEPOSITS-													
25		SS	25.0			SP	Medium dense, gray poorly-graded SAND (SP), mps = 0.02 in., wet								95	S				
							-MARINE DEPOSITS-													
							-MARINE DEPOSITS-													
							-MARINE DEPOSITS-													
30							-GLACIAL TILL DEPOSITS-													

Water Level Data			Sample ID			Well Diagram			Summary								
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	U	S	G	C	B	BORING NO.					
			Bottom of Casing	Bottom of Hole	Water								Open End Rod	Undisturbed Sample	Split Spoon Sample	Geoprobe	Field Vane
1/5/2006	1200		30.0	30.5	8.5							30.5					
1/5/2006	1223		--	25.8	7.2							65, 2U					

Field Tests: Dilatancy: R - Rapid S - Slow N - None
 Toughness: L - Low M - Medium H - High
 Plasticity: N - Nonplastic L - Low M - Medium H - High
 Dry Strength: N - None L - Low M - Medium H - High V - Very High
 *NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.
 NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

TEST BORING REPORT

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (In.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test					
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength	
30	45	S6	30.0		30.5	SM	Dense, gray silty SAND (SM), mps = 0.2 in., wet			25	20	40	15					
	50/1	2	30.6		30.6		-GLACIAL TILL DEPOSITS-											
							Very dense, dark gray weathered rock fragments-WEATHERED BEDROCK-											
							Split spoon refusal at 30.6 ft.											
							Bottom of exploration at 30.6 ft. below ground surface											
35																		
40																		
45																		
50																		
55																		
60																		
65																		
70																		

NOTES:

FILE NO.

05109

BORING NO.

B101

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

TEST BORING REPORT

PROJECT	FINAL DESIGN INVESTIGATION, REDEVELOPMENT OF VILLAGE CAFÉ	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	12/30/2005
DRILLER	M. PORTER/R. IDANO	DATE FINISHED	1/3/2006

Elevation	28.5	ft.	Datum	NGVD 1929	Boring Location	See Plan		
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobile B47	Hammer Type	Drilling Mud	Casing Advance
Type	HSA	SS	--	<input type="checkbox"/> Truck	<input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head	<input type="checkbox"/> Bentonite	Type Method Depth
Inside Diameter (in.)	3.375	1.375	--	<input type="checkbox"/> ATV	<input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input type="checkbox"/> Polymer	HSA/SPIN/30.0
Hammer Weight (lb.)		140		<input type="checkbox"/> Track	<input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Automatic	
Hammer Fall (in.)		30		<input type="checkbox"/> Skid	<input checked="" type="checkbox"/> Trailer	<input checked="" type="checkbox"/> Cutting Head		
Drilling Notes:							2.0 x 7.0 Field Vane	

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Platyness	Toughness	Plasticity	Strength			
0					0.2		-BITUMINOUS CONCRETE-													
	11	S1	0.5			SW	Very dense, brown well-graded SAND (SW), mps = 0.75 in., damp	5	10	30	30	20	5							
	12				0.7		-FILL-													
	44	8	2.0			SM	Very dense, gray-brown silty SAND (SM), ash, brick, mps = 1.3 in., wet	5	5	10	15	50	15							
							Note: probable cobbles from 2.0 to 4.0 ft.													
					4.0		-FILL-													
5	4	S2	5.0			SM	Loose, brown silty SAND (SM), frequent clay seams to layers, mps = 0.2 in., wet		5	5		65	25							
	4				6.4		-MARINE DEPOSITS-													
	6					CL	Stiff, gray-brown lean CLAY (CL), wet							100	N	M	M			
	8	24	7.0				-MARINE DEPOSITS-													
10	WOR	FV1	10.0-10.6				FV1 from 10.0 to 10.6 ft. = 12/2 ft. lb., Su = 440 psf													
	WOH	S3	10.0			CL	Soft, gray lean CLAY (CL), frequent sand partings, occasional black streaks, mps = 0.02 in., wet					5	95	N	M	M				
	WOH						-MARINE DEPOSITS-													
	WOH	24	12.0																	
15	WOR	S4	15.0			CL	Soft, gray lean CLAY (CL), frequent sand partings, mps = 0.02 in., wet					5	95	N	M	M				
	WOR						-MARINE DEPOSITS-													
	WOH	24	17.0																	
20	WOR	FV2	20.0-20.6		20.0		FV2 from 20.0 to 20.6 ft. = 18/2 ft. lb., Su = 670 psf													
	WOR	S5	20.0		21.5	CL	Medium stiff, gray lean CLAY (CL), frequent sand seams to layers, mps = 0.02 in., wet					20	80	N	M	M				
	7					SP	Loose, gray poorly-graded SAND (SP), mps = 0.02 in., wet					95	5							
	6	24	22.0				-MARINE DEPOSITS-													
25	1	S6	25.0			SP	Very loose, gray poorly-graded SAND (SP), mps = 0.02 in., occasional silt laminae, wet					95	5							
	WOH						-MARINE DEPOSITS-													
	3																			
	7	24	27.0																	
30																				

Water Level Data			Sample ID			Well Diagram		Summary	
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	Riser Pipe	Overburden (Linear ft.)	32.0
			Bottom of Casing	Bottom of Hole	Water				
1/3/2006	1115		30.0	26.0	18.5	T	Filter Sand	Number of Samples	75
1/19/2006			Well	20.0	2.6	U	Cuttings		
						S	Grout		
						G	Concrete		
						FV	Bentonite Seal		
Field Tests								BORING NO. B102	
Dilatancy:			R - Rapid S - Slow N - None			Plasticity: N - Nonplastic L - Low M - Medium H - High			
Toughness:			L - Low M - Medium H - High			Dry Strength: N - None L - Low M - Medium H - High V - Very High			
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.									
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.									

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test					
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength	
30	14 5	S7	30.0		30.4	SP	Medium dense, gray poorly-graded SAND (SP), mps = 0.02 in., wet -MARINE DEPOSITS-					100						
	14 31	24	32.0			SM	Medium dense, gray silty SAND with gravel (SM), mps = 1.2 in., wet -GLACIAL TILL DEPOSITS-	5	10	10	10	50	15					
							Bottom of exploration at 32.0 ft. below ground surface No refusal											
							Note: Installed 1.0 in. PVC observation well at 20.0 ft.											
35																		
40																		
45																		
50																		
55																		
60																		
65																		
70																		

NOTES:

FILE NO.

05109

BORING NO.

B102

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

TEST BORING REPORT

PROJECT	FINAL DESIGN INVESTIGATION, REDEVELOPMENT OF VILLAGE CAFÉ	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	12/30/2005
DRILLER	M. PORTER	DATE FINISHED	12/30/2005

Elevation	34.1	ft.	Datum	NGVD 1929	Boring Location	See Plan		
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobile B47	Hammer Type	Drilling Mud	Casing Advance
Type	HSA	SS	--	<input type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety	<input type="checkbox"/> Bentonite	Type Method Depth
Inside Diameter (in.)	3.375	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input checked="" type="checkbox"/> Doughnut	<input type="checkbox"/> Polymer	HSA/SPIN/20.0
Hammer Weight (lb.)	--	140	--	<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Automatic	<input checked="" type="checkbox"/> None	
Hammer Fall (in.)	--	30	--	<input type="checkbox"/> Skid <input checked="" type="checkbox"/> Trailer	<input checked="" type="checkbox"/> Cutting Head	Drilling Notes: 2.0 x 7.0 in. Field Vane		

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength					
0					0.1		-BITUMINOUS CONCRETE-															
10		S1	0.5			SM	Dense, gray-brown silty SAND (SM), ash, brick, mps = 0.75 in., dry	5	10	20	50	15										
15					2.3		-FILL-															
15		S4	2.5			SW	Dense, brown well-graded SAND (SW), mps = 0.5 in., dry	5	30	40	25											
					3.0		-FILL-															
5								5	15	20	40	20										
2		S2	5.5			SM	Medium dense, dark brown silty SAND (SM), ash, mps = 0.3 in., wet	5	15	20	40	20										
5																						
8					6.3		-FILL-															
12		S4	7.5			CL	Stiff, gray lean CLAY (CL), frequent sand partings, mps = 0.02 in., wet						15	85	N	M	M					
							-MARINE DEPOSITS-															
10		WOH	FV1	10.5-11.1			FV1 from 10.5 to 11.1 ft. = 22/3 ft. lb., Su = 820 psf															
		WOH	S3	10.5		CL	Medium stiff, gray lean CLAY (CL), frequent sand seams, mps = 0.02 in., wet						10	90	N	M	M					
		WOH	S4	12.5			-MARINE DEPOSITS-															
15		WOR	S4	15.5		CL	Medium stiff, gray lean CLAY (CL), frequent sand layers, mps = 0.02 in., wet						20	80	N	M	M					
							-MARINE DEPOSITS-															
					17.3		-MARINE DEPOSITS-															
						SP	Loose, gray poorly-graded SAND (SP), mps = 0.02 in., wet						95	5								
							-MARINE DEPOSITS-															
							Advanced HSA to 20.0 ft. Running sand conditions in augers															
20							Bottom of exploration at 20.0 ft. below ground surface No refusal															
25																						
30																						

Water Level Data			Sample ID			Well Diagram			Summary													
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	T	U	S	G	FV	<input type="checkbox"/> Riser Pipe	<input type="checkbox"/> Screen	<input type="checkbox"/> Filter Sand	<input type="checkbox"/> Cuttings	<input type="checkbox"/> Grout	<input type="checkbox"/> Concrete	<input type="checkbox"/> Bentonite Seal	Overburden (Linear ft.)	20.0	Number of Samples	4S
			Bottom of Casing	Bottom of Hole	Water														BORING NO.	B103		
12/30/2005	0949		--	17.0	6.0																	
Field Tests		Dilatancy: R - Rapid S - Slow N - None						Plasticity: N - Nonplastic L - Low M - Medium H - High														
		Toughness: L - Low M - Medium H - High						Dry Strength: N - None L - Low M - Medium H - High V - Very High														
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.																						
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.																						

TEST BORING REPORT

PROJECT	FINAL DESIGN INVESTIGATION, REDEVELOPMENT OF VILLAGE CAFÉ	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	12/29/2005
DRILLER	M. PORTER	DATE FINISHED	12/29/2005

Elevation	29.0	ft.	Datum	NGVD 1929	Boring Location	See Plan		
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobile B47	Hammer Type	Drilling Mud	Casing Advance
Type	HSA	SS	--	<input type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety	<input type="checkbox"/> Bentonite	Type Method Depth
Inside Diameter (in.)	3.375	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input checked="" type="checkbox"/> Doughnut	<input type="checkbox"/> Polymer	HSA/SPIN/40.0
Hammer Weight (lb.)	--	140	--	<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Automatic	<input checked="" type="checkbox"/> None	
Hammer Fall (in.)	--	30	--	<input type="checkbox"/> Skid <input checked="" type="checkbox"/> Trailer	<input checked="" type="checkbox"/> Cutting Head	Drilling Notes:		

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength					
0					0.2		-BITUMINOUS CONCRETE-															
	5	S1	0.5			SW-SM	Very dense, brown well-graded SAND with silt and gravel (SW-SM), mps = 1.3 in., wet	10	10	30	30	10	10									
	12						-FILL-															
	75/4	7	1.9				Note: brick, 3 to 6 in. rock fragments from 1.9 to 5.0 ft.															
5							-FILL-															
	2	S2	5.0		5.2	SW-SM	Loose, brown well-graded SAND with silt and gravel (SW-SM), wet	10	10	30	30	10	10									
	1				6.0	SM	Loose, brown silty SAND (SM), frequent silt seams, wet-MARINE DEPOSITS							70	30							
	6				6.5	SM	Loose, gray silty SAND (SM), one 1 in. gravel piece, wet	5						10	65	20						
	9	S3	7.8		7.0	SW-SM	Loose, brown well-graded SAND with silt and gravel (SW-SM), mps = 1.0 in., wet	10	10	30	30	10	10									
							-GLACIAL TILL DEPOSITS-															
10																						
	1	S3	10.0			SM	Medium dense, gray-brown silty SAND (SM), one in. gravel piece, wet	50		10	10	15	15									
	2						-GLACIAL TILL DEPOSITS-															
	9																					
	16		12.0																			
15																						
	1	S4	15.0			SM	Very loose, gray silty SAND with gravel (SM), mps = 1.3 in., wet	10	5	10	30	30	15									
	1						-GLACIAL TILL DEPOSITS-															
	2																					
	1		17.0																			
20																						
	WOR	S5	20.0			SM	Very loose, gray silty SAND (SM), mps = 0.2 in., wet			10	45	30	15									
	WOH						Note: probably pushed gravel															
	4						-GLACIAL TILL DEPOSITS-															
	3		22.0																			
25																						
	8	NR	25.0				No recovery															
	13																					
	15																					
	8		27.0																			
							-GLACIAL TILL DEPOSITS-															
30																						

Water Level Data			Sample ID			Well Diagram		Summary		
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	Riser Pipe	Overburden (Linear ft.)	42.0	
			Bottom of Casing	Bottom of Hole	Water					T
12/29/2005	1515		--	9.4	7.8	U <td>Filter Sand</td> <th colspan="2">Number of Samples</th> <td>8S</td>	Filter Sand	Number of Samples		8S
						S <td>Cuttings</td> <td colspan="2">BORING NO.</td> <td>B104</td>	Cuttings	BORING NO.		B104
						G <td>Grout</td> <td colspan="2"></td> <td></td>	Grout			
						FV <td>Concrete</td> <td colspan="2"></td> <td></td>	Concrete			
							Bentonite Seal			

Field Tests Dilatancy: R - Rapid S - Slow N - None Plasticity: N - Nonplastic L - Low M - Medium H - High
 Toughness: L - Low M - Medium H - High Dry Strength: N - None L - Low M - Medium H - High V - Very High

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
30	15	S6	30.0			SM	Dense, gray silty SAND with gravel (SM), mps = 1.3 in., slightly bonded, wet	15	10	30	20	10	15				
	23																
	27																
	33	12	32.0				-GLACIAL TILL DEPOSITS-										
35	18	S7	35.0			SM	Very dense, gray silty SAND with gravel (SM), mps = 1.3 in., slightly bonded, wet	15	10	30	20	10	15				
	30																
	36				36.9		Very dense, dark gray rock fragments, dry										
	27	9	37.0		38.0		Note: probable cobble -GLACIAL TILL DEPOSITS-										
40	86	S8	40.0			SW	Very dense, gray well-graded SAND (SW), mps = 0.2 in., wet			10	40	45	5				
	53																
	76						-GLACIAL TILL DEPOSITS-										
	87	12	42.0				Bottom of exploration at 42.0 ft. below ground surface No refusal										
45																	
50																	
55																	
60																	
65																	
70																	

NOTES:

FILE NO.

05109

BORING NO.

B104

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

PROJECT: FINAL DESIGN INVESTIGATION, REDEVELOPMENT OF VILLAGE CAFÉ
 LOCATION: NEWBURY STREET, PORTLAND, MAINE
 CLIENT: GFJ ACQUISITIONS I, LLC
 CONTRACTOR: MAINE TEST BORINGS, INC.
 DRILLER: R. IDANO
 STI JOB NO.: 05109
 PROJECT MGR.: C. DIMATTEO
 FIELD REP.: K. B. STEPHENSON
 DATE STARTED: 1/4/2006
 DATE FINISHED: 1/4/2006

Elevation	39.5	ft.	Datum	NGVD 1929	Boring Location	See Plan		
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobile B47	Hammer Type	Drilling Mud	Casing Advance
Type	HSA	SS	--	<input type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input checked="" type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety	<input type="checkbox"/> Bentonite	Type Method Depth
Inside Diameter (in.)	2.5	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input checked="" type="checkbox"/> Doughnut	<input type="checkbox"/> Polymer	HSA/SPIN/24.0
Hammer Weight (lb.)	--	140	--	<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Automatic	<input checked="" type="checkbox"/> None	
Hammer Fall (in.)	--	30	--	<input type="checkbox"/> Skid <input checked="" type="checkbox"/> Trailer	<input checked="" type="checkbox"/> Cutting Head	Drilling Notes: 2.0 x 7.0 in. Field Vane		

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0							Advanced SSA through frost to 1.0 ft.													
9	7	S1	1.0		2.0	SM	Medium dense, brown silty SAND (SM), mps = 0.5 in., dry -FILL-		10	30	25	20	15							
7						CL	Stiff, gray-brown mottled lean CLAY (CL), damp								100	N	M	M		
13		16	3.0				-MARINE DEPOSITS-													
5	5	S2	5.0		5.8	CL	Stiff, gray-brown mottled lean CLAY (CL), damp								100	N	M	M		
7						CL	Stiff, gray lean CLAY (CL), occasional sand partings and dark streaks, mps = 0.02 in., wet					5	95	N	M	M	M			
7		24	7.0				-MARINE DEPOSITS-													
10	WOH	FV1	10.0-10.6				FV1: from 10.0 to 10.6 ft. = 9/4 ft. lb., Su = 330 psf													
WOH	S3		10.0			CL	Soft, gray lean CLAY (CL), occasional sand partings and dark streaks, mps = 0.02 in., wet						5	95	N	M	M			
WOH							-MARINE DEPOSITS-													
WOH	24		12.0																	
15	1	S4	15.0		15.6	CL	Soft, gray lean CLAY (CL), occasional sand partings and dark streaks, mps = 0.02 in., wet								5	95	N	M	M	
1						CL	Soft, gray lean CLAY (CL), frequent sand seams to layers, mps = 0.02 in., wet						20	80	N	M	M			
2		24	17.0				-MARINE DEPOSITS-													
					19.0															
20	1	S5	20.0			SP	Loose, brown poorly-graded SAND (SP), mps = 0.1 in., clay seam at 21.2 ft., wet					15	80	5						
3					21.6		-MARINE DEPOSITS-													
2		24	22.0			SM	Loose, gray silty SAND (SM), mps = 0.5 in., wet		10	30	25	20	15							
1					24.0		-GLACIAL TILL DEPOSITS-													
25							HSA refusal at 24.0 ft. Bottom of exploration at 24.0 ft. below ground surface													
30																				

Water Level Data			Sample ID			Well Diagram			Summary						
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	U	S	G	FV	<input type="checkbox"/> Riser Pipe <input type="checkbox"/> Screen <input type="checkbox"/> Filter Sand <input type="checkbox"/> Cuttings <input type="checkbox"/> Grout <input type="checkbox"/> Concrete <input type="checkbox"/> Bentonite Seal	Overburden (Linear ft.)	Rock Cored (Linear ft.)	Number of Samples	
			Bottom of Casing	Bottom of Hole	Water										BORING NO.
1/4/2006	1025		--	19.0	8.0							24.0	--	55	
												BORING NO.	B105		
Field Tests		Dilatancy: R - Rapid S - Slow N - None				Plasticity: N - Nonplastic L - Low M - Medium H - High				Dry Strength: N - None L - Low M - Medium H - High V - Very High					
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.															
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.															

TEST BORING REPORT

PROJECT	FINAL DESIGN INVESTIGATION, REDEVELOPMENT OF VILLAGE CAFÉ	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	12/21/2005
DRILLER	R. IDANO	DATE FINISHED	12/22/2005

Elevation	44.1	ft.	Datum	NGVD 1929	Boring Location	See Plan		
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobile B47	Hammer Type	Drilling Mud	Casing Advance
Type	HSA	SS	--	<input type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety	<input type="checkbox"/> Bentonite	Type Method Depth
Inside Diameter (in.)	3.375	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input checked="" type="checkbox"/> Doughnut	<input type="checkbox"/> Polymer	HSA/SPIN/40.0
Hammer Weight (lb.)	--	140	--	<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Automatic	<input checked="" type="checkbox"/> None	
Hammer Fall (in.)	--	30	--	<input type="checkbox"/> Skid <input checked="" type="checkbox"/> Trailer	<input checked="" type="checkbox"/> Cutting Head	Drilling Notes: 2.0 x 7.0 in. Field Vane		

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength			
0					6.2		-BITUMINOUS CONCRETE-													
	36	S1	0.5			SW-SM	Very dense, brown well-graded SAND with silt and gravel (SW-SM), mps = 0.3 in., dry	20	30	10	30	10								
	29						-FILL-													
	50/1	8	1.6				Note: unable to auger through obstruction at 1.6 ft. Moved boring 4.0 ft.													
5																				
	50	S2	5.0			SW-SM	Medium dense, brown well-graded SAND with silt and gravel (SW-SM), brick, wood, glass, mps = 0.3 in., dry	20	30	10	30	10								
	12						-FILL-													
	9				6.6															
	8	12	7.0			SP	Medium dense, gray-brown poorly-graded SAND (SP), wet													
							-MARINE DEPOSITS-													
10					10.0															
	WOR	S3	10.0			SP	Very loose, gray-brown poorly-graded SAND (SP), frequent clay seams, mps = 0.02 in., wet						85	15						
	WOR																			
	WOH				11.5															
	1	20	12.0			CL	Very soft, gray lean CLAY (CL), frequent sand seams, mps = 0.02 in., wet						15	85	N	M	M			
							-MARINE DEPOSITS-													
15																				
	WOR	FV1	15.0-15.6				FV1 from 15.0 to 15.6 ft. = 10/1 ft. lb., Su = 370 psf													
	WOR	S4	15.0			CL	Soft, gray lean CLAY (CL), wet								100	N	M	M		
	WOR				16.6															
	WOR	24	17.0			CL	Soft, gray lean CLAY with sand (CL), mps = 0.02 in., wet						20	80	N	M	M			
							-MARINE DEPOSITS-													
20																				
	WOR	S5	20.0			CL	Soft, gray lean CLAY (CL), occasional black streaks and fine sand partings, mps = 0.02 in., wet						5	95	N	M	M			
	WOR																			
	WOR																			
	WOH	24	22.0																	
							-MARINE DEPOSITS-													
25																				
	WOR	FV2	25.0-25.6				FV2 from 25.0 to 25.6 ft. = 11/2 ft. lb., Su = 410 psf													
	WOR	S6	25.0			CL	Soft, gray lean CLAY (CL), occasional fine sand partings, mps = 0.02 in., wet						5	95	N	M	M			
	WOH																			
	1	24	27.0																	
							-MARINE DEPOSITS-													
30																				

Water Level Data						Sample ID		Well Diagram		Summary										
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	U	S	G	FV	Riser Pipe	Screen	Filter Sand	Cuttings	Grout	Concrete	Bentonite Seal	Overburden (Linear ft.)	Rock Cored (Linear ft.)	Number of Samples
			Bottom of Casing	Bottom of Hole	Water															
12/22/2005	1120		40.0	41.1	16.3													41.1	--	95
12/22/2005	1145		--	8.5	7.0															
BORING NO. B107																				
Field Tests		Dilatancy: R - Rapid S - Slow N - None						Plasticity: N - Nonplastic L - Low M - Medium H - High						Dry Strength: N - None L - Low M - Medium H - High V - Very High						
		Toughness: L - Low M - Medium H - High																		
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.																				
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.																				

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test			
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity
30	WOR	S7	30.0		30.4	CL	Soft, gray lean CLAY (CL), occasional fine sand partings, mps = 0.02 in., wet					5	95	N	M	M
	WOH					CL	Soft, gray lean CLAY (CL), frequent sand seams to layers, mps = 0.02 in., wet					20	80	N	M	M
	WOH 4	24	32.0													
-MARINE DEPOSITS-																
35	WOR	S8	35.0			CL	Stiff, gray lean CLAY (CL), frequent sand seams to layers, mps = 0.02 in., wet					20	80	N	M	M
	2				36.3											
	10					SP	Medium dense, gray poorly-graded SAND (SP), mps = 0.02 in., wet					100				
-MARINE DEPOSITS-																
40	34	S9	40.0		40.0	SW	Very dense, gray well-graded SAND (SW), mps = 0.2 in., wet			10	40	50				
	63															
	507.1	24	41.1		41.1											
-MARINE DEPOSITS-																
							Split spoon refusal at 41.1 ft. on probable bedrock Bottom of exploration at 41.1 ft. below ground surface									
45																
50																
55																
60																
65																
70																

NOTES:

FILE NO.

05109

BORING NO.

B107

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

PROJECT: FINAL DESIGN INVESTIGATION, REDEVELOPMENT OF VILLAGE CAFE STI JOB NO. 05109
 LOCATION: NEWBURY STREET, PORTLAND, MAINE PROJECT MGR. C. DIMATTEO
 CLIENT: GFI ACQUISITIONS I, LLC FIELD REP. K. B. STEPHENSON
 CONTRACTOR: MAINE TEST BORINGS, INC. DATE STARTED 12/22/2005
 DRILLER: R. IDANG DATE FINISHED 12/22/2005

Elevation	49.2	ft.	Datum	NGVD 1929	Boring Location	See Plan		
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobile B47	Hammer Type	Drilling Mud	Casing Advance
Type	HSA	SS	--	<input type="checkbox"/> Truck <input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety	<input type="checkbox"/> Bentonite	Type Method Depth
Inside Diameter (in.)	3.375	1.375	--	<input type="checkbox"/> ATV <input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input checked="" type="checkbox"/> Doughnut	<input type="checkbox"/> Polymer	HSA/SPIN/40.0
Hammer Weight (lb.)	--	140	--	<input type="checkbox"/> Track <input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Automatic	<input checked="" type="checkbox"/> None	
Hammer Fall (in.)	--	30	--	<input type="checkbox"/> Skid <input checked="" type="checkbox"/> Trailer	<input checked="" type="checkbox"/> Cutting Head	Drilling Notes: 2.0 x 7.0 in. Field Vane		

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel					Sand					Field Test		
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Platynny	Toughness	Plasticity	Strength			
0					0.2		-BITUMINOUS CONCRETE-													
	13	S1	0.5			SM	Dense, brown to black silty SAND (SM), brick, ash, mps = 0.5 in., dry	5	10	10	60	15								
	11																			
	21																			
	36	9	2.5																	
					3.0															
5																				
	9	S2	5.0			SP	Dense, brown poorly-graded SAND (SP), occasional coarse to medium sand seams, silt seams from 6.8 to 7.0 ft., mps = 0.2 in., wet	5	5	85	5									
	13																			
	19																			
	17	16	7.0																	
					8.5															
10																				
	2	S3	10.0			SM	Very loose, gray-brown mottled silty SAND (SM), trace coarse sand, one 1.3 in. gravel piece, wet				85	15								
	1																			
	2																			
	4	18	12.0																	
15																				
	1	S4	15.0			SM	Loose, brown silty SAND (SM), frequent silt seams, mps = 0.5 in., wet	5	10	15	50	20								
	2																			
	2				16.0															
	2					SM	Loose, gray silty SAND (SM), frequent clay seams, mps = 0.1 in., wet		5	70	25									
	3	24	17.0																	
20																				
	WOR	S5	20.0			SM	Very loose, gray silty SAND (SM), frequent clay seams, mps = 0.1 in., wet		5	70	25									
	WOH				20.8															
	1					CL	Medium stiff, gray lean CLAY (CL), wet													
	3	24	22.0																	
25																				
	WOH	FV1	25.0-25.6				FV1 from 25.0 to 25.6 ft. = 15/2 ft. lb., Su = 560 psf													
	WOH	S6	25.0			CL	Medium stiff, gray lean CLAY (CL), occasional sand partings, mps = 0.02 in., wet		5	95	N	M	M							
	1																			
	2	24	27.0																	
30																				

Water Level Data				Sample ID		Well Diagram		Summary													
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	U	S	G	FV	Riser Pipe	Screen	Filter Sand	Cuttings	GROUT	Concrete	Bentonite Seal	Overburden (Linear ft.)	Rock Cored (Linear ft.)	Number of Samples	
			Bottom of Casing	Bottom of Hole	Water																40.0
BORING NO. B108																					
Field Tests		Dilatancy: R - Rapid S - Slow N - None				Plasticity: N - Nonplastic L - Low M - Medium H - High				Toughness: L - Low M - Medium H - High				Dry Strength: N - None L - Low M - Medium H - High V - Very High							
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.																					
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.																					

TEST BORING REPORT

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size*, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand			Field Test				
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength
30	WOR	S7	30.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand partings to seams, mps = 0.02 in., wet					15	85	N	M	M	
	WOR																
	3 4	24	32.0														
-MARINE DEPOSITS-																	
35	WOR	S8	35.0			CL	Medium stiff, gray lean CLAY (CL), frequent sand layers, mps = 0.02 in., wet					40	60	N	M	M	
	2				36.0												
	10 15	24	37.0			SP-SM	Medium dense, gray poorly-graded SAND with silt (SP-SM), mps = 0.1 in., wet			10	80	10					
-MARINE DEPOSITS-																	
Note: advanced HSA to 40.0 ft. Running sand conditions in augers																	
40	Bottom of exploration at 40.0 ft. below ground surface No refusal																
45																	
50																	
55																	
60																	
65																	
70																	

NOTES:

FILE NO.

05109

BORING NO.

B108

*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.

NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.

TEST BORING REPORT

PROJECT	FINAL DESIGN INVESTIGATION, REDEVELOPMENT OF VILLAGE CAFÉ	STI JOB NO.	05109
LOCATION	NEWBURY STREET, PORTLAND, MAINE	PROJECT MGR.	C. DIMATTEO
CLIENT	GFI ACQUISITIONS I, LLC	FIELD REP.	K. B. STEPHENSON
CONTRACTOR	MAINE TEST BORINGS, INC.	DATE STARTED	12/23/2005
DRILLER	R. IDANO	DATE FINISHED	12/23/2005

Elevation	38.5	ft	Datum	NGVD 1929	Boring Location	See Plan			
Item	Casing	Sampler	Core Barrel	Rig Make & Model	Mobile B47	Hammer Type	Drilling Mud	Casing Advance	
Type	HSA	SS	--	<input type="checkbox"/> Truck	<input type="checkbox"/> Tripod	<input type="checkbox"/> Cat-Head	<input type="checkbox"/> Safety	<input type="checkbox"/> Bentonite	Type Method Depth
Inside Diameter (in.)	3.375	1.375	--	<input type="checkbox"/> ATV	<input type="checkbox"/> Geoprobe	<input checked="" type="checkbox"/> Winch	<input checked="" type="checkbox"/> Doughnut	<input type="checkbox"/> Polymer	HSA/SPIN/20.0
Hammer Weight (lb.)	--	140	--	<input type="checkbox"/> Track	<input type="checkbox"/> Air Track	<input type="checkbox"/> Roller Bit	<input type="checkbox"/> Automatic	<input checked="" type="checkbox"/> None	
Hammer Fall (in.)	--	30	--	<input type="checkbox"/> Skid	<input checked="" type="checkbox"/> Trailer	<input checked="" type="checkbox"/> Cutting Head	Drilling Notes: 2.0 x 7.0 in. Field Vane		

Depth (ft.)	Sampler Blows per 6 in.	Sample No. & Recovery (in.)	Sample Depth (ft.)	Well Diagram	Stratum Change (ft.)	USCS Symbol	Visual-Manual Identification & Description (density/consistency, color, GROUP NAME & SYMBOL, maximum particle size, structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel		Sand		Field Test						
								% Coarse	% Fine	% Coarse	% Medium	% Fine	% Fines	Dilatancy	Toughness	Plasticity	Strength	
0							Note: advance HSA through ice/frost to 1.0 ft.											
36		S1	1.0		1.2	SM	Dense, brown silty SAND (SM), mps = 0.5 in., damp -FILL-	5	5	5	75	15						
19						CL	Very stiff, gray lean CLAY (CL), frequent sand partings, mps = 0.02 in., damp					15	85	N	M	M		
11																		
16		18	3.0				-MARINE DEPOSITS-											
5																		
8		S2	5.0			CL	Very stiff, gray lean CLAY (CL), frequent sand partings, mps = 0.02 in., damp					10	90	N	M	M		
9																		
10																		
10		24	7.0				-MARINE DEPOSITS-											
10																		
10	WOH	S3	10.0			CL	Soft, gray lean CLAY (CL), one 0.5 in. concrete, wet					10	90	N	M	M		
	WOH																	
	WOH	24	12.0				-MARINE DEPOSITS-											
15					14.4													
	WOR	FV1	15.0-15.6				FV1 from 15.0 to 15.6 ft. = 10/1 ft. lb., Su = 370 psf											
	WOH	S4	15.0			CL	Soft, gray lean CLAY (CL), frequent sand layers, mps = 0.02 in., wet					25	75	N	M	M		
	4																	
	10	24	17.0		16.8	SP	Medium dense, gray poorly-graded SAND (SP), mps = 0.02 in., wet					100						
							-MARINE DEPOSITS-											
20																		
	8	S5	20.0		20.5	SP	Very dense, gray to brown poorly-graded SAND (SP), mps = 0.02 in., wet					100						
	13																	
	50/4	24	21.4		21.4	SM	Very dense, gray silty SAND with gravel (SM), mps = 0.75 in., wet -GLACIAL TILL DEPOSITS-	5	10	15	15	40	15					
							Split spoon refusal at 21.4 ft. Bottom of exploration at 21.4 ft. below ground surface											
							Note: Installed 1.0 in PVC observation well at 20.0 ft.											
25																		
30																		

Water Level Data			Sample ID			Well Diagram			Summary																
Date	Time	Elapsed Time (hr.)	Depth in feet to:			O	T	U	S	G	FV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Overburden (Linear ft.)	Rock Cored (Linear ft.)	Number of Samples					
			Bottom of Casing	Bottom of Hole	Water																BORING NO.				
1/19/2006			Well	20.0	3.3													21.4	--	55					
																	BORING NO.	B109							
Field Tests		Dilatancy: R - Rapid S - Slow N - None						Plasticity: N - Nonplastic L - Low M - Medium H - High						Toughness: L - Low M - Medium H - High						Dry Strength: N - None L - Low M - Medium H - High V - Very High					
*NOTE: Maximum Particle Size is determined by direct observation within the limitations of sampler size.																									
NOTE: Soil identifications based on visual-manual methods of the USCS system as practiced by Sebago Technics, Inc.																									

DIVISION 3
Concrete



SECTION 03300 - CAST-IN-PLACE CONCRETE

1.1 GENERAL

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions, Supplementary General Conditions and Division 1 Specification Sections, apply to this Section.
- B. Summary
 1. Furnish all labor, materials, tools, equipment and services necessary for and reasonably incidental to complete the cast-in-place concrete work as shown on the drawings or as specified.
 2. Refer to Structural Notes on Drawings.
 3. Sub-contractor shall grade and backfill for concrete work as directed by the Contractor and Soils Engineer.
 4. Below slab insulation is specified in Section 07210.
- C. Submittals: Submit the following:
 1. Product data for reinforcement, forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, and others as requested by Architect.
 2. Shop drawings for fabricating, bending, and placing concrete reinforcement.
 3. Shop drawings showing control joint layout for sidewalks, interior slab and exterior slab construction.
 4. Laboratory test reports or evaluation reports for concrete materials and concrete mix designs.
 5. Written report to Architect for each proposed concrete mix at least 15 days prior to start of concreting. Do not begin concrete production until mixes have been reviewed by Architect. Identify for each mix submitted the method by which proportions have been selected.
 - a. For mix designs based on field experience, include individual strength test results, standard deviation, and required average compressive strength $f'(cr)$ calculations.
 - b. For mix designs based on trial mixtures, include trial mix proportions, test results, and graphical analysis and show required average compressive strength $f'(cr)$.
 - c. Indicate quantity of each ingredient per cubic yard of concrete.
 - d. Indicate type and quantity of admixtures proposed or required.

- D. Quality Assurance: Comply with provisions of ACI 301, "Specifications for Structural Concrete for Buildings," ACI 318, "Building Code Requirements for Reinforced Concrete," and CRSI "Manual of Standard Practice," except where more stringent requirements are indicated.
 - 1. Concrete Testing Service: Employ, at owner's expense, an independent testing agency acceptable to the architect to perform specified tests and other services required for quality assurance.
 - a. Testing agency shall meet ASTM E 329 requirements.
 - 2. Apply surface evaporation retardant to slab surface when water loss reaches .15 lbs of water loss per square foot (.6 kg per sm) per hour as determined in ACI 308.
 - 3. Source of Materials: Obtain materials of each type from same source for the entire project.

- E. Project Conditions:
 - Cold-Weather Concreting: Comply fully with the recommendations of ACI 306.
 - a. Well in advance of proposed concreting operations, advise the architect of planned protective measures including but not limited to heating of materials, heated enclosures, and insulating blankets.
 - 2. Hot-Weather Concreting: Comply fully with the recommendations of ACI 305R.
 - a. Well in advance of proposed concreting operations, advise the architect of planned protective measures including but not limited to cooling of materials before or during mixing, placement during evening to dawn hours, fogging during finishing and curing, shading, and windbreaks.

1.2 PRODUCTS

- A. Form Materials: Furnish form materials with sufficient stability to withstand pressure of placed concrete without bow or deflection.
 - 1. Forms for Unexposed and Exposed Concrete Surfaces: Suitable panel-type material to provide continuous, straight, smooth, exposed surfaces.
 - 2. Cylindrical Column Forms: Weather-resistant tubes of metal, plastic, or laminated paper or fiber.
 - 3. Form Coating: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

- B. Reinforcing Materials: As follows:
 - 1. Deformed Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.
 - 2. Welded Wire Fabric: ASTM A 185.
 - 3. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications, unless otherwise acceptable.
 - a. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.

- C. Concrete Materials: As follows:
 - 1. Portland Cement: ASTM C 150, Type 1 or Type 2.
 - a. The use of high early strength cement may be permitted only in concealed work and during the months of November, December, January, February and March with the approval of the Architect. It will not be permitted for slabs when the air temperature at the slab exceeds 80 degrees F.
 - 2. Fly Ash: ASTM C 618, Type F.
 - 3. Aggregates: ASTM C 33, except local aggregates of proven durability may be used when acceptable to Architect.
 - 4. Water: Potable.
 - 5. Fiber Reinforcement: Engineered polypropylene fibers designed for secondary reinforcement of concrete slabs.
 - 6. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
 - 7. Water: Potable.

- D. Admixtures: Provide admixtures that contain not more than 0.05 percent chloride ions.
 - 1. Air-Entraining Admixture: ASTM C 260.
 - 2. Water-Reducing, Retarding, and Accelerating Chemical Admixtures: ASTM C 494.
 - 3. Water-Reducing Non-Chloride Accelerator Admixture: ASTM C 494, Type E.
 - 4. Water-Reducing, Retarding Admixture: ASTM 494, Type D.
 - 5. Certification: Provide admixture manufacturer's written certification that chloride ion content complies with specified requirements.

- E. Related Materials: As follows:
1. Vapor Retarder: 10 mil virgin polyethelene w/ tape or adhesive acceptable to manufacturer of vapor retarder material.
 2. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
 3. Moisture-Retaining Cover: Waterproof paper, polyethylene film, or polyethylene-coated burlap, complying with ASTM C 171.
 4. Membrane-Forming Curing Compound: ASTM C 309, Type I. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.
 5. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
 6. Sealer for Interior and Exterior Slabs: "Dress and Seal"; L&M Construction Chemicals, Inc.
 7. Bonding Compound: Non-redispersable acrylic bonding admixture, ASTM C 1059, Type II.
 8. Expansion Joint Filler: Nonextruding bituminous type: ASTM D 1751, "Sonoflex F"; Sonneborn, Chemrex Inc.
- F. Mix Proportions and Design: Proportion mixes complying with mix design procedures specified in ACI 301.
1. Limit use of fly ash to not exceed 25 percent of cement content by weight.
 2. Design mixes to provide normal weight concrete with the following properties:
 - a. Exterior Slabs: 4000-psi, 28-day compressive strength; water-cement ratio, 0.45 maximum
 - b. All remaining concrete: 3000-psi, 28-day compressive strength; water-cement ratio, 0.50 maximum
 3. Limit maximum water-cement ratio of concrete exposed to freezing and thawing to 0.45.
 4. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows: Use mid-range or high-range water reducer in all concrete except footings.
 - a. Ramps, Slabs, and Sloping Surfaces: Not more than 4 inches.
 - b. Reinforced Foundation Systems: Not less than 1 inch and not more than 4 inches.
 - c. Other Concrete: Not more than 4 inches.
 - d. The method for determining the correct amount of water and aggregate for each batch shall permit the proportion of water to cement to be closely controlled and easily checked at any time.

5. Adjust mix designs when material characteristics, job conditions, weather, test results, or other circumstances warrant. Do not use revised concrete mixes until laboratory test data and strength results have been submitted to and reviewed by Architect.
 6. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.
 - a. When air temperature is between 85 degrees F and 90 degrees F reduce mixing and delivery time from 1 1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.
- G. Maximum size of coarse aggregate as recommended in ACI 211.1.
- H. Use air-entraining admixture in exterior exposed concrete, providing not less than 4.5 percent nor more than 7 percent entrained air for concrete exposed to freezing and thawing, and from 2 percent to 4 percent for other concrete. Do not use air-entraining in interior slabs.
- I. Use water-reducing, accelerating, and retarding admixtures that have been tested and accepted in mix designs in strict compliance with manufacturer's directions.
 1. Use water-reducing admixture in concrete as required for placement and workability.
 2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F.
- J. Job-Site Mixing: Use drum-type batch machine mixer, mixing not less than 1-1/2 minutes, but not more than 5 minutes for 1 cu. yd. or smaller capacity. Increase mixing time at least 15 seconds for each additional cu. yd.
- K. Ready-Mix Concrete: ASTM C 94.
- L. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity and amount of water introduced.
 1. Provide tickets on a daily basis during time of concrete pours.
- M. Sub-contractor shall provide curing and hardeners as specified in this Section.

1.3 EXECUTION

- A. Formwork: Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation, and position. Select form materials to obtain required finishes.
 - 1. Maintain formwork tolerances and surface irregularities within ACI 347 limits, Class A tolerances for concrete exposed to view and Class C tolerances for other concrete surfaces.
 - 2. Provide openings in formwork to accommodate work of other trades. Accurately place and securely support items built into forms.
 - 3. Clean and adjust forms prior to concrete placement. Apply form-release agents or wet forms as required. Retighten forms during concrete placement, if required, to eliminate mortar leaks.
- B. Vapor Retarders/Barriers: Place vapor retarder/barrier membrane for slabs on grade, with joints lapped 6 inches and sealed.
- C. Reinforcement: Accurately position and support reinforcement, and secure against displacement. Locate and support reinforcement to maintain minimum cover with metal chairs, runners, bolsters, spacers, and hangers as required. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
 - 1. Install welded wire fabric in lengths as long as practicable; lap at least one full mesh and lace splices with wire.
- D. Joints: Locate and install construction, isolation, and control joints as indicated or required. Locate construction joints so they do not impair strength and appearance of structure. Place isolation and control joints in slabs-on-ground to stabilize differential settlement and prevent random cracking.
- E. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown and specified below. Use saw cuts 1/8 inch (3 mm) wide by 1 inch (25 mm) of slab depth, unless otherwise indicated using the methods specified below.
 - 1. Saw control joints, 1 inch (25 mm) deep with Sof-Cut Model 280 saw, immediately after final troweling with cutting completed within 2 hours after final pass of trowel. Remove saw cut concrete spoils from floor surface immediately behind the saw cutting operations.

2. Contraction joints shall be placed in accordance with approved Shop Drawings, with a maximum panel area as specified below. The panel shall be as nearly square as possible. Conform to bay spacing wherever possible (at column centerlines, half bays, third bays, one quarter bays, etc.).
 3. Saw cut non-reinforced slabs on grade in accordance with the following maximum spacing;
 - a. 4 inch thick: 10 feet
 - b. 5 to 6 inches thick: 12 feet.
- F. Installation of Embedded Items: Set and build anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting diagrams, templates, and instructions provided by others for locating and setting.
1. Locate and set anchor bolts.
- G. Concrete Placement: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," for placing concrete in a continuous operation within planned joints or sections. Do not begin concrete placement until other affected work is completed.
1. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping so that concrete is worked around reinforcement and other embedded items and into forms.
 2. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.
 - a. In cold weather comply with ACI 306.
 - b. In hot weather comply with ACI 305.
- H. Finish of Formed Surface: As follows:
1. Smooth-Formed Finish: Provide a smooth finish for concrete surfaces exposed to view and surfaces to be covered with a coating or covering material applied directly to concrete. Repair and patch defective areas, with fins and other projections completely removed and smoothed. Parge all holes and indents in the concrete wall.

- I. Monolithic Slab Finishes: As follows:
 1. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish when surface water has disappeared and when concrete has stiffened sufficiently to permit operation of power-driven floats. Consolidate surface with power-driven floats or by hand-floating.
 - a. Check and level surface plane to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness). Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
 2. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed to view and slab surfaces to be covered with resilient flooring, carpet, paint, or other thin film-finish coating system.
 - a. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with surface leveled to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness). Grind smooth surface defects that would telegraph through applied floor covering system.
 3. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming.
 4. Nonslip Broom Finish: Apply nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - a. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 5. Slab Finish Schedule: Apply finishes in the following typical locations and as otherwise shown on the drawings:
 - a. Trowel finish:
 - (1) Exposed interior floors not otherwise scheduled.
 - (2) Surfaces to receive resilient tile.
 - (3) Surfaces to receive carpet.
 - (4) Surfaces to receive thickset tile over cleavage membrane.
 - b. Trowel and fine broom:
 - (1) Outdoor storage room.
 - (2) Sidewalks.
 - (3) Exterior slabs not otherwise scheduled.

- J. Curing: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather, apply an evaporation-control compound according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
1. Begin initial curing as soon as free water has disappeared from exposed surfaces.
 2. Continue curing unformed concrete surfaces by water ponding, continuous fog spraying, continuously wetted absorptive cover, or by moisture-retaining cover curing. Cure formed surfaces by moist curing until forms are removed. Keep concrete continuously moist for not less than 72 hours for high- early strength concrete and 7 days for all other concrete.
 3. Apply membrane-forming curing compound to exposed interior slabs and to exterior slabs, walks, and curbs as soon as final finishing operations are complete. Apply uniformly according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Use membrane-curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
 4. Apply Curing Compound on Interior Slabs receiving resilient flooring and carpet
 5. Cure exposed interior slabs with waterproof curing paper placed over slab that has been misted with water. Seal all joints and properly, weight down and maintain in intimate contact with the slab for the duration of the curing period.
 6. Sealer for Slabs: Install sealer as per manufacturer's instructions.
- K. Field Quality Control: The Owner will employ a testing agency to perform tests and to submit test reports. Sampling and testing for quality control during concrete placement shall include the following:
1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete and for each 50 yd. maximum; additional tests when concrete consistency seems to have changed.
 - b. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete and for each 50 yd. maximum.

- c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - d. Compression Test Specimen: ASTM C 31; one set of six standard cylinders for each compressive-strength test. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - e. Compressive-Strength Tests: ASTM C 39; One test per 50 cubic yards or fraction thereof for each day's pour of each concrete class; one test per 1500 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class. When less than 5 cubic yards is placed in one day, the architect may, at architect's option, waive laboratory testing of specimens if adequate evidence of satisfactory strength is provided. (Molding and curing of these specimens is not waived.); one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
 3. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
 4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 5. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
 6. Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
 7. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

8. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Cost of additional testing shall be borne by the contractor when unacceptable concrete has been verified.

END OF SECTION 03300

DIVISION 4
Masonry



SECTION 04200 - UNIT MASONRY

1.1 RELATED DOCUMENTS

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

1.2 GENERAL

- A. Performance Requirements: Provide unit masonry that develops installed compressive strengths (f'm) at 28 days as indicated.
- B. Submittals: In addition to product data, submit the following:
 - 1. Shop drawings for reinforcing detailing fabrication, bending, and placement of reinforcing bars.
 - 2. Material certificates for each different masonry product required.
 - 3. Material test reports from a qualified independent testing agency for mortar, grout mixes, and masonry units.
- C. Cold-Weather Requirements: Do not build on frozen subgrade or setting beds. Remove and replace unit masonry damaged by frost or freezing conditions. Comply with the following requirements:
 - 1. Cold-Weather Construction: Heat mixing water and sand to produce mortar and grout temperatures between 40 and 120 deg F. Maintain mortar and grout above freezing. Heat masonry units to 40 deg F if grouting.
 - 2. Cold-Weather Protection: Cover masonry with insulating blankets or provide enclosure and heat to maintain temperatures above 32 deg for 48 hours after construction. Install wind breaks when wind velocity exceeds 15 mi./hr.
- D. Hot-Weather Requirements: Protect unit masonry work from excessive evaporation of water from mortar and grout. Do not apply mortar to substrates with temperatures of 100 deg F and above.

1.3 PRODUCTS

- A. Concrete Masonry Units: ASTM C 90 and as follows:
 - 1. Compressive Strength: 1900 psi minimum average net-area compressive strength.
 - 2. Weight Classification: Normal weight.
 - 3. Provide Type I, moisture-controlled units.

4. Size: Standard units with nominal dimensions of 16 inches long, 8 inches high, and 4 inches thick (15-5/8 by 7-5/8 by 3-5/8 actual).
 5. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
 6. Provide square-edged units for outside corners, except where indicated as bullnose.
- B. Mortar and Grout Materials: As follows:
1. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.
 2. Hydrated Lime: ASTM C 207, Type S.
 3. Portland Cement-Lime Mix: Packaged blend of Portland cement complying with ASTM C 150, Type I or II and hydrated lime complying with ASTM C207, Type S.
 4. For pigmented mortars, use premixed, colored-cement or cement-lime mix of formulation required to produce color indicated.
 5. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch, use aggregate graded with 100 percent passing the No. 16 sieve.
 6. Aggregate for Grout: ASTM C 404.
 7. Mortar Pigments: Iron oxides and chromium oxides, compounded for use in mortar mixes and with a record of satisfactory performance in masonry mortars.
 8. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by the manufacturer for use in masonry mortar of composition indicated.
 9. Water: Potable.
- C. Steel Reinforcing Bars: Billet steel complying with ASTM A 615, Grade 60
- D. Deformed Reinforcing Wire: ASTM A 496, with ASTM A 153, Class B-2 zinc coating.
- E. Joint Reinforcement: Provide joint reinforcement formed from galvanized carbon-steel wire, ASTM A , Class 1, for interior walls; and ASTM A 153, Class B-2, for exterior walls.
1. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:
 - a. Wire Diameter for Side Rods: 0.1875 inch.
 - b. Wire Diameter for Cross Rods: 0.1875 inch .

2. For single-wythe masonry, provide truss or ladder design with single pair of side rods:
- F. Ties and Anchors, General: Provide ties and anchors that comply with the following requirements, unless otherwise indicated.
1. Wire: As follows:
 - a. Galvanized Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating for exterior walls; and with ASTM A 641, Class 1 coating for interior walls.
 2. Steel Sheet: As follows:
 - a. Galvanized Steel Sheet: ASTM A 366 (commercial quality) cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153, Class B-3, for sheet-metal ties and anchors in exterior walls; ASTM A 526, G 60 (commercial quality), steel sheet zinc coated by hot-dip process on continuous lines prior to fabrication, for sheet-metal ties and anchors in interior walls.
- G. Bent Wire Ties: Individual units prefabricated from bent wire to comply with requirements indicated.
- H. Rigid Anchors: Steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins. Shop paint with 2 coats of coal-tar epoxy-polyamide paint.
- I. Mortar and Grout Mixes: Do not use admixtures unless otherwise indicated. Do not use calcium chloride in mortar or grout.
1. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar indicated below:
 - a. Limit cementitious materials in mortar to portland cement and lime.
 2. Grout for Unit Masonry: Comply with ASTM C 476. Use grout of consistency to completely fill spaces intended to receive grout.
- J. Block Insulation Inserts (where shown on drawings): Korfil Inserts
1. Expandable polystyrene.

1.4 EXECUTION

- A. Cut masonry units with motor-driven saws. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

- B. Construction Tolerances: As follows:
1. Variation from Plumb: For vertical lines and surfaces do not exceed 1/4 inch in 10 feet, nor 3/8 inch in 20 feet, nor 1/2 inch in 40 feet or more. For vertical alignment of head joints, do not exceed plus or minus 1/4 inch in 10 feet nor 1/2 inch maximum.
 2. Variation from Level: Do not exceed 1/4 inch in 20 feet nor 1/2 inch in 40 feet.
 3. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet nor 3/4 inch in 40 feet.
 4. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch nor plus 1/2 inch.
 5. Variation in Mortar-Joint Thickness: Do not vary from bed-joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from head-joint thickness indicated by more than plus or minus 1/8 inch.
- C. Lay out walls in advance for accurate spacing of surface bond patterns and for accurate locating of openings, movement-type joints, returns, and offsets. Avoid the use of less-than-half-size units at corners, jambs, and where possible at other locations.
- D. Pattern Bond: Lay exposed masonry in running bond except where other bonds are indicated at special features.
1. Lay concealed masonry in running bond, or lap units at least 2 inches.
 2. Interlock wythes at corners and offsets in each course with masonry bond.
- E. Built-in Work: As construction progresses, build-in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.
- F. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- G. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
- H. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.
1. Use wood strips temporarily placed in cavity to collect mortar droppings. As work progresses, remove strips, clean off mortar droppings, and replace in cavity.

- I. Provide continuous horizontal-joint reinforcement as indicated. Install with a minimum cover of 5/8 inch on exterior, 1/2 inch elsewhere. Lap a minimum of 6 inches.
 - 1. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections.
- J. Provide masonry lintels where shown.
- K. Temporary Formwork and Shores: Construct formwork and shores to support reinforced masonry elements during construction.
 - 1. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.
- L. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.
 - 1. Do not exceed the following pour heights:
 - a. For minimum widths of grout spaces of 2 inches, pour height of 60 inches.
- M. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears prior to tooling joints.
- N. Final Cleaning: After mortar is thoroughly set and cured, remove mortar particles with nonmetallic scrapers.
- O. Protection: Institute protective measures as required to ensure that unit masonry work will be clean and undamaged at substantial completion.
- P. Masonry Waste Disposal: Dispose of masonry waste off site.
- Q. Field Quality Control: The Owner will employ a testing agency to perform inspections and to submit inspection reports. Inspections shall satisfy requirements of Schedule of Special Inspection Services prepared by Engineer of Record.

END OF SECTION 04200

SECTION 04300 – BRICK, ARCHITECTURAL STONE AND PRECAST ACCENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Face brick units.
 - 2. Architectural Stone Units.
 - 3. Precast Accents
 - 4. Mortar
 - 5. Reinforcement, anchorage, and accessories.
- B. Related Sections
 - 1. Section 05500 - Metal Fabrications: Loose steel lintels.
 - 2. Section 07620 - Flashing and Sheet Metal: Sheet metal and reglets for flashings.
 - 3. Section 07900 - Joint Sealers: Rod and sealant at control joints.

1.3 REFERENCES

- A. References are as follows:
 - 1. ANSI/ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.
 - 2. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - 3. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.
 - 4. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
 - 5. ASTM B370 - Copper Sheet and Strip for Building Construction.
 - 6. ASTM C216 - Facing Brick (Solid Masonry Units Made From Clay or Shale).
 - 7. ASTM C91 Standard Specification for Masonry Cement.
 - 8. ASTM C144 Standard Specification for Aggregate for Masonry Mortar.
 - 9. ASTM C150 Standard Specification for Portland Cement.
 - 10. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes.

11. ASTM C270 Standard Specification for Mortar for Unit Masonry.
12. ASTM C780 Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
13. ASTM C979 Standard Specification for Pigments for Integrally Colored Concrete.
14. ASTM C1324 Standard Test Method for Compressive Strength of Masonry Prisms
15. ASTM C1329 Standard Specification for Mortar Cement.
16. ASTM C1384 Standard Specification for Admixtures for Masonry Mortar
17. ASTM E514 Standard Test Method for Water Penetration and Leakage Through Masonry
18. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

1.4 SUBMITTALS

- A. Along with the submitted bid for the project provide a 24" wide by 32" high panel demonstrating the mason's workmanship that corresponds to the submitted bid amount. The panel shall have the brick ends finished to show how the mortar joint will wrap the corner (full brick corners not required). Follow the drawings and these specifications in all aspects that affect the appearance of the finished brick. Use a buff colored mortar and one of the bricks listed in this specification. Install this mock up in a portable wood frame. Label the mock-up with the brick contractor's name, the brick provided and the mortar color. The purpose of this mock up is to demonstrate workmanship to be provided for this project. This mock up will then be kept at the job site for comparison during construction and assure the agreed to workmanship is maintained.
- B. Submit product data under provisions of Section 01300.
- C. Samples:
 1. Submit samples of each of the face brick selected from the list of brick in this specification. Samples to illustrate color, texture and extremes of color range.
 2. Submit three 12"x24" samples representative of the Architectural Stone to be provided.
 3. Submit one 16"x24" sample representative of the Precast Horizontal Band to be provided.
 4. Submit one 8"x16" " sample representative of the Precast header to be provided.

- D. Submit color selection charts for mortar.
- E. Submit manufacturer's certificate under provisions of Section 01400 that products meet or exceed specified requirements.
- F. Submit mortar manufacturer's installation instructions under provisions of Section 01300.

1.5 QUALIFICATIONS

- A. Installer: Company specializing in and with a minimum of five years experience in performing the work of this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 01600.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store and protect products under provisions of Section 01600.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: IMIAC - Recommended Practices and Specifications for Cold Weather Masonry Construction.
- B. Do not build or apply mortar products on frozen substrates.
 - 1. Remove and replace unit masonry damaged by frost or by freezing conditions.
- C. Hot-Weather Requirements: Protect unit masonry work from excessive evaporation of water from mortar and grout. Do not apply mortar to substrates with temperatures of 100 deg F and above.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate work with related trades.
- B. Coordinate the masonry work with installation of window anchors, installation of structural steel, steel joists, metal stairs, and other items as required.

1.9 MOCK UPS

- A. Prior to the start of brick construction the brick and mortar color selections will be made. Provide one 40"x48" mock up for each of the brick colors selected using the mortar color selected for each brick color. This will be reviewed for approval of the brick color, mortar color and workmanship. Allow for one additional mock up wall of each brick color in the event the selections are not approved.
- B. The mock up wall shall show expected workmanship to be provided. If the mock up is rejected due to workmanship and non compliance with the specification a new mock up wall shall be constructed at the contractor's expense correcting the reasons for rejecting previous mock up wall. Work on the building shall not begin until an approved mock up is achieved. Mock up wall shall not to be included as part of the finish work and shall be disposed of properly. The intent is to provide a quality project that is satisfactory to all involved.

PART 2 - PRODUCTS

2.1 BRICK UNITS

- A. Running brick actual size: 3 5/8" x 7 5/8" x 2 1/4" inches.
- B. Provide the brick from each of the colors listed below for the project.
- C. Provide the following ASTM C-216, Grade SW, FBS, bricks :
 - 1. Red Brick, Color Scheme A:
 - a. Morin Brick Company; Old Port Red Range.
 - 2. Brown Brick, Color Scheme B:
 - a. Morin Brick Company; Woodland Brown Brushed Velour.
- D. If a brick substitution is proposed, provide a demonstration of its match to the brick listed above. Provide the cost to the project of this brick along with the costs of the bricks listed above.

2.2 ARCHITECTURAL STONE

- A. Manufacturer: Shouldice Designer Stone.
- B. Product Description
 - 1. Running bond actual size: 3 5/8" x 23 5/8" x 11 5/8" inches.
 - 2. 1"x2" margin at top edge of alternating courses.
 - 3. Profiles as shown on the Drawings.
 - 4. Finish: Tapestry.

5. Color: Antique Bronze. Color to be confirmed during the submittal process along with brick selections.

2.3 PRECAST CONCRETE ACCENTS

A. Horizontal Precast Accent

1. Size: 4 5/8" x 47 5/8" x 15 5/8" inches.
2. Profile as shown on the Drawings.
3. 1" bevel at top edge.
4. Dado or kerf in top surface for flashing set in sealant.
5. Bottom inside corner notched to allow for steel angle support.
6. Slots formed for tie selected to anchor to structure.
7. Finish: Smooth.
8. Color: Color to be selected during the submittal process along with brick selections.

B. Precast Wall Cap

1. Size: 14" x 47 5/8" x 7 5/8" inches.
2. Profile as shown on the Drawings.
3. 1" bevel at top edges.
4. Hole formed on bottom to anchor to structure.
5. Finish: Smooth.
6. Color: Color to be selected during the submittal process along with brick selections.

C. Window Lintel Accent

1. Size: 3 5/8" x 7 5/8" high inches. Length sized for 4" wider than window rough opening width (2" beyond at each jamb).
2. Profile as shown on the Drawings.
3. Finish: Smooth.
4. Color: Color to be selected during the submittal process along with brick selections.

2.4 COLORED MORTAR MIXES

A. Manufacturer: SPEC MIX, Inc.

1. Substitutions only permitted with submittal that demonstrate an exact equal to this specified product.

B. Proprietary Products/Systems. Dry, Pre-blended mortar mixes:

1. SPEC MIX Pre-Blended Colored Mortar Mix:
 - a. aggregate and color pigments.
 - b. Mortar Type: Property Mixture Type N.
 - c. Aggregate Type: Fine.
 - d. Material Standard for Aggregate: Comply with ASTM C144.

- e. Material Standard for Portland Cement: Comply with ASTM C150.
- f. Material Standard for Hydrated Lime: Comply with ASTM C207.
- g. Material Standard for Masonry Cement: Comply with ASTM C91.
- h. Material Standard for Mortar: Comply with ASTM C270.
- i. Material Standard for Masonry Grout: Comply with ASTM C476.
- j. Material Standard for Pigments: Comply with ASTM C979.
- k. Material Standard for Mortar Cement: Comply with ASTM C1329.
- l. Mortar Color: To be selected from manufacturer's standard color selections.

2.5 REINFORCEMENT AND ANCHORAGE

- A. Single Wythe Joint Reinforcement: Truss or Ladder type; hot dip galvanized after fabrication cold-drawn steel conforming to ANSI/ASTM A82, 3/16 inch side rods with 1/8 inch cross ties.
- B. Strap Anchors: A36 bar stock bent steel shape, section 1 x 1/4 inch G90 unprotected finish as required.
- C. Corrugated Formed Sheet Metal Wall Ties: 12 gage thick, galvanized steel finish.
- D. Formed Steel Wire Wall Ties: 12 gage thick, galvanized steel finish.
- E. Horizontal Precast Accent: Hohmann & Barnard Rotite #429 or SRX type anchors.
- F. Precast Wall Cap Accent: 1/2" steel dowels.

2.6 FLASHINGS

- A. Copper/Kraft Paper Flashings: 3 oz/sq ft sheet copper bonded to fiber reinforced asphalt treated Kraft paper.
- B. Copper: ASTM B370, cold rolled; 24 oz/sq ft, natural finish.
- C. Galvanized Steel: ASTM A525, G90 finish, 24 gage core steel.

2.7 ACCESSORIES

- A. Preformed Control Joints: Rubber, Neoprene or Polyvinylchloride material. Provide with corner and tee accessories, heat or cement fused joints, manufactured by W.R. Grace or equal.

- B. Joint Filler: Closed cell polyvinylchloride; oversized 50 percent to joint width; self-expanding; maximum lengths unjointed; manufactured by W.R. Grace or equal.
- C. Building Paper: #30 asphalt saturated felt.
- D. Mortar Break:
 - 1. Advanced Building Products inc., Mortar Break. .8"x10"x50'.
 - 2. Hohmann & Barnard, Inc., The Mortar Mitt, 3/4"x10"x5'.
 - 3. Wire-Bond, Mortar Net, (2) layers .4"x10"x5'.
- E. Weeps:
 - 1. Advanced Building Products inc., Weep Tubes, 3/8"x4".
 - 2. Hohmann & Barnard, Inc., #341W, 3/8" OD x 4" long tubes.
 - 3. Wire Bond, , #3600, 3/8" OD x 4" long tubes.
- F. Brick Vents:
 - 1. Hohmann & Barnard, Inc., #QV.
- G. Cleaning Solutions: Non-acidic, not harmful to masonry work or adjacent materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify items provided by other Sections of work are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.
- D. Beginning of installation means installer accepts existing conditions.

3.2 GENERAL

- A. Review and follow manufacturers' installation instructions to achieve desired final appearance of brick.
- B. Install Mortar Breaks above all weep hole locations and as noted here. Provide at bottom of wall, at relieving angle. Provide around the perimeter of the building at the top of all the window openings except it is not required over the windows at the top of the brick veneer.

- C. All brick colors go around the outside corners and change at an inside corner. Review the elevations with the plans further information.

3.3 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied by other Sections.
- B. Fasten wall ties to substrate following manufacturer's instructions for each substrate type.
- C. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.4 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension and as agreed to through approval of mock-up. Form vertical and horizontal joints of uniform thickness.
- C. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches maximum.
- D. Architectural Stone Units:
 - 1. Bond: Running.
 - 2. Coursing: 12".

3.5 MORTAR

- A. Comply with the instructions and recommendations of the mortar manufacturer.
- B. Specific instructions:
 - 1. Fill head and bed joints for full thickness of the face shells to provide the greatest resistance to water penetration.
 - 2. Tooling:
 - a. Mortar Joints: Recessed concave. No mortar shall be present on the face of the brick.
 - b. Tool the mortar joints when they are thumb print hard to provide the greatest resistance to water-penetration and to help minimize hairline cracks between the mortar and the brick

3. Cover the top of unfinished masonry work to protect it from the weather and to prevent accumulation of water.
4. Follow manufacturer's instructions for mixing mortar.
5. Cleaning:
 - a. Remove "primary" efflorescence from masonry walls exposed in the finished work in accordance with the manufacturer's recommendations and the NCMA TEK Bulletin #8-3A.
 - b. Remove dirt or stains from masonry walls exposed in the finished work in accordance with the manufacturer's recommendations and the NCMA TEK Bulletin #8-2A.
 - c. Promptly remove excess wet mortar containing integral water-repellent mortar admixture from the face of the masonry as work progresses. Do not use strong acids, overaggressive sandblasting or high-pressure cleaning methods.
 - d. Comply with applicable environmental laws and restrictions.

3.6 PLACING AND BONDING

- A. Strictly follow the manufacturers' instructions for the mixing of the mortar and brick installation.
- B. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- C. Lay hollow masonry units with face shell bedding on head and bed joints.
- D. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
- E. Remove excess mortar as Work progresses.
- F. Interlock intersections and external corners.
- G. Perform job site cutting of masonry units with proper tools to provide straight edges. Prevent broken masonry unit corners or edges.
- H. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- I. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.7 WEEPS

- A. Install weeps in veneer at 16 inches oc in brick and at each joint in other masonry, horizontally above through-wall flashing, above shelf angles and opening lintels, at bottom of walls, and as may be indicated on the drawings.

3.8 REINFORCEMENT AND ANCHORAGES - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement where specified in drawings. Reinforcement shall be 8 guage wire truss, placed @ 16" oc horizontally.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place joint reinforcement continuous in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches. Extend minimum 16 inches each side of openings.

3.9 MASONRY FLASHINGS

- A. Extend flashings horizontally at foundation walls, above ledge or shelf angles and lintels, under parapet caps, at bottom of walls, and as indicated on the drawings.
- B. Turn flashing up minimum 12 inches and secure to wall behind, seal to sheathing substrate behind air infiltration barrier.
- C. Lap end joints minimum 6 inches and seal watertight.
- D. Turn flashing, fold, and seal at corners, bends, and interruptions.

3.10 LINTELS

- A. Install loose steel lintels over window openings, door openings, and penetrations.
- B. Place and consolidate grout fill without displacing reinforcing.
- C. Maintain minimum 8 inch bearing on each side of opening.

3.11 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Form control joint with a sheet building paper bond breaker, fitted to one side of the hollow contour end of the block unit. Fill the resultant elliptical core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.
- C. Sealant color to match mortar color.
- D. Size control joint in accordance with Section 07900 for sealant performance.

3.12 BUILT-IN WORK

- A. As work progresses, build in steel and aluminum door frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates and other items furnished by other Sections.
- B. Build in items plumb and level.
- C. Do not build in organic materials subject to deterioration.

3.13 TOLERANCES

- A. The following tolerances are maximums. The intent is to avoid spreading or stretching the brick coverage over the wall with wider joints.
- B. Maximum Variation From Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
- C. Maximum Variation From Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation From Level Coursing: 1/16 inch in 3 feet and 1/8 inch in 10 feet.
- E. Maximum Variation of Joint Thickness: 1/16 inch in 3 feet.
- F. Maximum Variation From Cross Sectional Thickness of Walls: 1/4 inch.

3.14 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves, grounds, etc. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain Architect/Engineer approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.15 CLEANING

- A. Cleaning shall be as per specification in BIA Technical Notes #20 and #14.
- B. Clean masonry with the least aggressive cleaning solution and technique possible.
- C. Comply with cleaning procedure and recommendations of the manufacturers of both the cleaning solution and the unit masonry.
- D. Remove excess mortar and mortar smears.
- E. Replace defective mortar. Match adjacent work.
- F. Clean soiled surfaces with cleaning solution.
- G. Use non-metallic tools in cleaning operations.

3.16 PROTECTION OF FINISHED WORK

- A. Protect finished installation under provisions of Section 01500.

END OF SECTION

DIVISION 5

Metals



SECTION 05120 - STRUCTURAL STEEL

1.1 RELATED DOCUMENTS

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

1.2 GENERAL

- A. Structural Performance: Engineer structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated.
- B. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer to prepare calculations, Shop Drawings, and other structural data for structural steel connections.
- C. Submittals: In addition to Product Data and mill test reports on structural steel and bolts, submit Shop Drawings detailing fabrication of structural steel components, including connections, splices, holes, welds, and bolts.
 - 1. Include Shop Drawings and calculations signed and sealed by a professional engineer responsible for their preparation who is legally authorized to practice in the state the project is located and who is experienced in providing structural steel engineering services.
- D. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 - 2. ASTM A 6 (ASTM A 6M) "Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use."
 - 3. Research Council on Structural Connections' (RCSC) "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- E. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel."
 - 1. Present evidence that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

- F. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
- G. Engineer's Qualifications: Fabricator's Engineer shall be familiar with steel connection design and shall carry professional liability insurance with a minimum per incident and annual policy limit of \$1,000,000. Proof of insurance shall be supplied to Architect.

1.3 PRODUCTS

- A. Structural Steel Shapes, Plates, and Bars: ASTM A 36 (ASTM A 36M), carbon steel.
- B. Structural Steel Wide Flange Sections: ASTM A 992 (ASTM A 992M), Grade 50, high-strength, low-alloy columbium-vanadium steel.
- C. Cold-Formed Structural Steel Tubing: ASTM A 500, Grade B.
- D. Steel Pipe: ASTM A53, Grade B.
- E. Anchor Rods, Bolts, Nuts: ASTM F1554 Gr 36 ksi., unheaded rods.
- F. Nonhigh-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel, hex-head bolts; carbon-steel nuts; and flat, unhardened steel washers, uncoated.
- G. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers, uncoated.
- H. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
- I. Nonmetallic, Shrinkage-Resistant Grout: Premixed, ASTM C 1107, of consistency suitable for application.
- J. Fabrication: Fabricate and assemble structural steel in shop to greatest extent possible. Fabricate structural steel according to AISC specifications referenced in this Section and in Shop Drawings.
 - 1. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.

2. Shop install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.
 3. Shop install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - a. Connection Type: Snug tightened, unless indicated as direct-tension, or tensioned shear/bearing connections.
 - b. Slip-critical bolts are prohibited from all connections.
 4. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
- K. Shop Priming: Shop prime steel, except surfaces embedded in concrete or mortar, surfaces to be field welded, and surfaces to receive sprayed-on fireproofing.
1. Surface Preparation: SSPC-SP 2 "Hand Tool Cleaning" or SSPC-SP 3 "Power Tool Cleaning."
 2. Priming: Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1.4 EXECUTION

- A. Erect structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section.
- B. Base and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates and set on wedges, shims, or setting nuts as required.
 1. Tighten anchor bolts, cut off wedges or shims flush with edge of base or bearing plate, and pack grout solidly between bearing surfaces and plates.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Install and tighten nonhigh-strength bolts, except where high-strength bolts are indicated.
- E. Install and tighten high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 1. Connection Type: Snug tightened, unless indicated as direct-tension, or tensioned shear/bearing connections.

- F. Weld Connections: Comply with AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
- G. Shop and Field Quality Control: Owner will engage an independent testing and inspecting agency to perform shop and field inspections and tests and to prepare test reports. Inspections shall satisfy requirements of Schedule of Special Inspection Services prepared by Engineer of Record.
 - 1. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.
 - 2. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.
 - 3. High-strength bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - 4. In addition to visual inspection, welded connections will be inspected and tested according to AWS D1.1 procedures.

END OF SECTION 05120

SECTION 05310 - STEEL DECK

1.1 RELATED DOCUMENTS

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

1.2 GENERAL

- A. Submittals: Product data and manufacturer's certificates for each type of deck and accessory and the following:
 - 1. Shop drawings showing layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other units of Work.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel," including welder certification.
- C. Fire-Test-Response Characteristics: Where indicated, provide labeled steel deck panels identical to those tested as part of an assembly for fire resistance per ASTM E 119 by a testing and inspection agency performing testing and follow-up services, that is acceptable to authorities having jurisdiction.

1.3 PRODUCTS

- A. Composite Steel Floor Deck: Fabricate panels with integrally embossed or raised pattern ribs and interlocking side laps, conforming to SDI Publication No. 28 "Specifications and Commentary for Composite Steel Floor Deck," the minimum section properties indicated, and the following:
 - 1. Galvanized and Shop-Primed Steel Sheet: ASTM A 446, Grade A, G 60 (ASTM A 446M, Grade A, Z 180) zinc coated according to ASTM A 525 (ASTM A 525M); cleaned, pretreated, and primed with manufacturer's baked-on, lead- and chromate-free rust-inhibitive primer.
 - 2. Profile Depth: As indicated.
 - 3. Design Uncoated-Steel Thickness: As indicated.

- B. Accessories: Floor deck accessory materials and floor deck pour stops and closures that comply with requirements indicated and recommendations of the steel deck manufacturer.
 - 1. Shear Connectors: AWS D1.1, Type B, headed stud type, cold-finished carbon steel.

1.4 EXECUTION

- A. Install deck panels and accessories according to applicable specifications and commentary of SDI Publication No. 28, manufacturer's recommendations, and requirements of this Section.
- B. Place deck panels on supporting framing and adjust to final position with ends accurately aligned and bearing on supporting framing before being permanently fastened. Do not stretch or contract side lap interlocks.
- C. Place deck panels flat and square and fasten to supporting framing without warp or deflection.
- D. Cut, reinforce, and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to the decking.
- E. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
- F. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces with galvanized repair paint according to ASTM A 780 and the manufacturer's instructions.
- G. Touchup Painting: Wire brush, clean, and paint scarred areas, welds, and rust spots on both surfaces of installed deck panels.
- H. Touchup Painting: Cleaning and touchup painting of field welds, abraded areas, and rust spots, as required after erection and before proceeding with field painting, are included in Division 9 Section "Painting."
- I. Field Quality Control: The Owner will employ a testing agency to perform inspections and to submit inspection reports. Inspections shall satisfy requirements of Schedule of Special Inspection Services prepared by Engineer of Record.

END OF SECTION 05310

SECTION 05400 – COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exterior non-load-bearing curtain-wall framing.
- B. Gypsum Exterior sheathing. Related Sections include the following:
 - 1. Division 7 Section "Building Insulation" for exterior insulation.
 - 2. Division 9 Section "Gypsum Board Assemblies" for interior non-load-bearing metal-stud framing, shaft wall assemblies, ceiling-suspension assemblies, and acoustical insulation in interior walls.

1.3 Division 9 Section "Gypsum Board Shaft-Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies. DEFINITIONS

- A. Minimum Uncoated Steel Thickness: Minimum uncoated thickness of cold-formed framing delivered to the Project site shall be not less than 95 percent of the thickness used in the cold-formed framing design. Lesser thicknesses shall be permitted at bends due to cold forming.
- B. Producer: Entity that produces steel sheet coil fabricated into cold-formed members.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design Loads: As indicated.
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Non-Load-Bearing Curtain-Wall Framing: Horizontal deflection of 1/360 of the wall height, and maximum 0.3".

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F.
 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection (for non-load bearing framing only) of primary building structure as follows:
 - a. Downward movement of 1 inch .
- B. Design exterior non-load-bearing curtainwall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.5 SUBMITTALS

- A. General: Submit in accordance with Section 01300.
- B. Product Data: For each type of cold-formed metal framing product and accessory indicated.
- C. 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. Design Data: 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.
 - a. Gages indicated are minimum allowable gage. Verify load capacity of manufacturer's product being furnished for the Project.
 2. Submitted drawings and calculations must be complete and accurate. If upon initial review of the submittal, the submittal is rejected or returned for revisions and resubmittal, the Architect and Structural Engineer of Record (SER) will review the resubmittal one additional time at no charge to the contractor. Subsequent reviews required to obtain Architect and SER approval will be invoiced to the General Contractor at consultant's standard hourly rates.

- D. Welding Certificates: Copies of certificates for welding procedures and personnel.
- E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Engineer's Certificate: Submit professional engineer's certificate of liability insurance.
- G. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:
 - 1. Expansion anchors.
 - 2. Power-actuated anchors.
 - 3. Mechanical fasteners.
 - 4. Vertical deflection clips.
 - 5. Miscellaneous structural clips and accessories.
- H. Research/Evaluation Reports: Evidence of cold-formed metal framing's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced Installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Engineering Responsibility: Engage a fabricator who assumes undivided responsibility for engineering cold-formed metal framing by employing a qualified professional engineer to prepare design calculations, Shop Drawings, and other structural data.
- C. 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.
 - 1. Professional engineer shall provide certificate of liability insurance, with coverage of not less than \$1500,000.00.
 - 2. See General Notes on drawings for additional requirements.

- D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
 - E. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."
 - F. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
 - G. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" for calculating structural characteristics of cold-formed metal framing :
 - 1. Center for Cold-Formed Steel Structures (CCFSS) Technical Bulletin: "AISI Specification Provisions for Screw Connections."
 - H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
 - B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cold Formed Metal Framing:
 - a. Dietrich Industries, Inc.
 - b. MarinoWare; Div. of Ware Industries, Inc.
 - c. Unimast, Inc.

2. Weather-Resistant Gypsum Sheathing Board:
 - a. USG
 - b. National Gypsum.
 - c. Georgia-Pacific Corporation.

2.2 MATERIALS

- A. All galvanized studs, joists, and accessories shall be of the type, size, steel thickness and spacing required by structural design and shall be manufactured to ASTM A 653 with a yield stress of either 33 KSI or 50 KSI as required. Minimum galvanized coating is G-60 in conformance with ASTM C 955.

2.3 NON-LOAD-BEARING CURTAIN-WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955, and as follows:
 1. Minimum Uncoated-Steel Thickness: 0.0428 inch
 2. Flange Width: 1-5/8 inches
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, complying with ASTM C 955, and as follows:
 1. Minimum Uncoated-Steel Thickness: 0.0428 inch [Matching steel studs].
 2. Flange Width: 1-1/4 inches.
- C. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads, and as follows:
 1. Minimum Uncoated-Steel Thickness: 0.0428 inch

2.4 FRAMING ACCESSORIES

- A. Miscellaneous Framing Components: Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. General: Provide required or indicated items; provide galvanized fasteners for assemblies having galvanized major steel components.

- B. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.
- C. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.
- D. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- E. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.
- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.
- D. Spary Foam Insulation: Great Stuff Pro, Wall & Floor Construction Adhesive.
 - 1. Location: Sealing all gaps and concealed voids

2.7 EXTERIOR SHEATHING

- A. Gypsum Sheathing Board:
 - 1. Type and Thickness: Exterior Drywall, 1/2 inch thick.
 - 2. Size: 48 by 96 inches .
 - 3. Available Product: Subject to compliance with requirements, a product that may be incorporated into the Work includes, but is not limited to
 - a. Georgia-Pacific Corp.; Dens-Glass Gold.
 - b. USG or National Gypsum; 1/2" Exterior Drywall.

2.8 SHEATHING ACCESSORIES

- A. Fasteners for Gypsum Sheathing to Metal Framing: Steel drill screws, ASTM C 954, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- B. Fasteners for Plywood Sheathing to Metal Framing: Hilti Kwik-Flex or Elco Dril-Flex; no substitution, 10-24 x 2-3/4" wafer head No. 3.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Attach continuous angles, supplementary framing, or tracks to structural members indicated.
- B. Grout bearing surfaces uniform and level to ensure full contact of bearing flanges or track webs on supporting concrete or masonry construction.

3.3 INSTALLATION, GENERAL

- A. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.
- B. Install cold-formed metal framing and accessories plumb, square, and true to line, with lateral bracing and bridging, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.
 - 1. Cut framing members by sawing or shearing; do not torch cut.

2. Fasten cold-formed metal framing members by welding or screw fastening, 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. Use minimum of 2 self-tapping metal screws per connection, unless otherwise indicated.
- C. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members. Splicing of load bearing components is prohibited.
- D. 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.
- E. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.
- F. Install 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.
- G. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.
- H. 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 and as follows:
 1. Space individual framing members no more than plus or minus 1/8 inch from plan location and a maximum of 2 inches from abutting walls. Construct corners using minimum of three studs. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
 2. Install cold-formed metal framing to a maximum out-of-square tolerance of 1/8-inch (3 mm).

3. Align top and bottom tracks; locate as indicated, and secure track to substrates at maximum 24 inches on center, using fastening methods specified in manufacturer's printed installation instructions for project substrate types.
4. Install double studs at jambs of openings for doors, cased openings, and windows; install intermediate studs above and below openings to align with wall stud spacing.
5. Seat studs in track square with track flange, with stud ends tight to tracks (maximum 1/16 inch from surface of track web at only one end).
6. Attach cross studs for attachment of fixtures; install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
7. Locate ends of load bearing components directly over support points.
8. Provide web stiffeners at locations indicated or required.

3.4 NON-LOAD-BEARING CURTAIN-WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:
 1. Stud Spacing: As indicated
 2. Stud Spacing: As indicated
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 1. Install single deep-leg deflection tracks and anchor to building structure.
 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 3. Connect vertical deflection clips to [infill] studs and anchor to primary building structure.

- E. Install horizontal bridging in curtain-wall studs, spaced in rows indicated on Shop Drawings but not more than 54 inches apart. Fasten at each stud intersection.
 - 1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within [12 inches] of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - a. Install solid blocking at centers indicated.
 - 2. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 3. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
- 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 curtain-wall-framing system.

3.5 SHEATHING INSTALLATION

- A. General: Install gypsum sheathing to comply with GA-253 and manufacturer's written instructions.
- B. Cut boards at penetrations, edges, and other obstructions of the work; fit tightly against abutting construction, except provide a 3/8-inch setback where non-load-bearing construction abuts structural elements.
- C. Coordinate sheathing installation with flashing and joint sealant installation so these materials are installed in the sequence and manner that prevent exterior moisture from passing through completed exterior wall assembly.
- D. Apply fasteners so screw heads bear tightly against face of sheathing boards but do not cut into facing.
- E. Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.

- F. Horizontal Installation: Abut ends of boards over centers of stud flanges and stagger end joints of adjacent boards not less than one stud spacing. Screw-attach boards at perimeter and within field of board to each steel stud at approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

3.6 FIELD QUALITY CONTROL

- A. Testing: Engage a qualified independent testing agency to perform field quality-control testing.
- B. Field and shop welds will be subject to inspection and testing.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace Work that does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected Work with specified requirements.

3.7 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. Protect cutouts, corners, and joints in sheathing by filling with a flexible sealant or by applying tape recommended by sheathing manufacturer at time sheathing is applied.
- C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure cold-formed metal framing and sheathing are without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Miscellaneous metal fabrications.
 - 2. Shop coatings.
 - 3. Elevator pit ladder.
 - 4. Angle lintels.
 - 5. Angle sills for elevator entrances.

- B. Related Sections:
 - 1. Concrete: Division 3.

1.3 REFERENCES

- A. ANSI A14.3-1984 -- American National Standard for Ladders - Fixed - Safety Requirements; 1984.
- B. ASTM A 36/A 36M-92 -- Standard Specification for Structural Steel; 1992.
- C. ASTM A 307-92a -- Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength; 1992.
- D. ASTM A 501-89 -- Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 1989.
- E. ASTM A 563-93 -- Standard Specification for Carbon and Alloy Steel Nuts; 1993.
- F. ASTM C 1107-91a -- Standard Specification for Packaged Dry, Hydraulic - Cement Grout (Nonshrink); 1991.
- G. AWS D1.1-92 -- Structural Welding Code -- Steel; American Welding Society; 1992.

- H. AWS D1.3-89 -- Structural Welding Code--Sheet Steel; American Welding Society; 1989.
- I. FS FF-B-561D -- Bolts, (Screw), Lag; 1989.
- J. FS FF-S-325 -- Shield, Expansion; Nail Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry); 1957 (Amended 1965).
- K. FS FF-W-84A -- Washers, Lock (Spring); 1967 (Amended 1980).
- L. FS FF-W-92B -- Washer, Flat (Plain); 1974.
- M. FS TT-P-664D -- Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant; 1988.
- N. SSPC-PA 1 -- Shop, Field, and Maintenance Painting; Steel Structures Painting Council; 1991.
- O. SSPC-SP 1 -- Solvent Cleaning; Steel Structures Painting Council; 1982.
- P. SSPC-SP 3 -- Power Tool Cleaning; Steel Structures Painting Council; 1989.
- Q. SSPC-SP 5 -- White Metal Blast Cleaning; Steel Structures Painting Council; 1991.
- R. SSPC-SP 6 -- Commercial Blast Cleaning; Steel Structures Painting Council; 1991.
- S. SSPC-SP 8 -- Pickling; Steel Structures Painting Council; 1991.
- T. SSPC-SP 10 -- Near-White Blast Cleaning; Steel Structures Painting Council; 1991.

1.4 SUBMITTALS

- A. Shop Drawings: For each fabricated item, show the following:
 1. Plans and elevations.
 2. Jointing and connections.
 - a. Indicate welded connections using standard AWS symbols; indicate net weld length.
 3. Profiles of sections and reinforcing.
 4. Fasteners and anchors.
 5. Accessories.
 6. Location of each finish.

1.5 JOB CONDITIONS

- A. Coordination with Masonry and Concrete Work: Where fabricated items or their anchors are to be embedded into concrete and masonry work, deliver such items to those performing the installation, together with coordination drawings and installation instructions.

PART 2 - PRODUCTS

2.1 MATERIALS - METALS

- A. Steel Shapes:
 - 1. Plates, bars, angles, channels, and H-sections: ASTM A 36.

2.2 MATERIALS - MISCELLANEOUS

- A. Grout: Nonmetallic, noncorrodible, nonshrink, factory blended and packaged; complying with ASTM C 1107; recommended by manufacturer for exterior use.
- B. Concrete Inserts: Style as required for application.
- C. Fasteners: Use fasteners suitable for the material being fastened and for the type of connection required.
 - 1. For exterior use or built into exterior walls: Nonferrous stainless steel, zinc coated or cadmium plated.
 - 2. Use fasteners of same material as items being fastened unless otherwise indicated.
 - 3. Bolts and studs: ASTM A 307.
 - 4. Nuts: ASTM A 563.
 - 5. Lag bolts: FS FF-B-561.
 - 6. Plain washers: FS FF-W-92.
 - 7. Lock washers: FS FF-W-84.
 - 8. Expansion shields: FS FF-S-325.
- D. Shop Primer: Rust-inhibitive, lead and chromate free, low VOC primer, complying with FS TT-P-664, or equivalent.

2.3 FABRICATION – GENERAL AND METAL STAIR SYSTEM

- A. Fabricate and shop-assemble in largest practical sections for delivery to site.
 - 1. Prepare and reinforce fabrications as required to receive applied items.
 - 2. Fabricate items with joints tightly fitted and secured.
 - 3. Make exposed joints tight, flush, and hairline.

- B. Fasteners: Use concealed fasteners if possible.
 - 1. Exposed fasteners: Flathead, countersunk type unless otherwise indicated.
- C. Anchors: Fabricate to suit conditions indicated; use anchors of same material and finish as item except where specifically indicated otherwise.
- D. Welding:
 - 1. Welding of steel: Comply with AWS D1.1 recommendations.
 - 2. Provide continuous welds at welded corners and seams.
 - 3. Exposed welds: Grind flush and smooth.

2.4 FABRICATION - LADDERS

- A. Fixed Ladders: Comply with ANSI A14.3 and applicable regulations; construct as indicated.
 - 1. All steel construction.
 - a. Shop prime.
 - b. Rungs: 3/4 inch diameter solid bar, at 12 inches on center.
 - 2. Side rails: Continuous, flat, 1/2- by 2-1/2-inch bar.
 - a. Rail spacing: 18 inches clear.
 - b. Where other handholds are not indicated:
 - (1) Make rails extend at least 50 inches above the top rung; return to wall.
 - 3. Weld rungs to side rails, on centerline.
 - 4. Supports: At top and bottom, and at not more than 4 feet on center; weld or bolt brackets to ladder.
 - 5. Clearance from wall and obstructions: 7 inches, minimum, to centerline of rungs.
 - 6. Smooth sharp edges and remove burrs from side rails.

2.5 FABRICATION - SHOP COATINGS

- A. Shop prime all iron and steel fabrications.
- B. Prepare surfaces to be coated as follows:
 - 1. Solvent-clean in accordance with SSPC-SP 1.
 - 2. Interior fabrications: Clean in accordance with SSPC-SP 3, SSPC-SP 5, SSPC-SP 6, SSPC-SP 8, or SSPC-SP 10.
- C. Shop Priming: Comply with SSPC-PA 1.
 - 1. Apply primer immediately following surface preparation.
 - 2. Do not prime surfaces to be welded.
 - 3. Do not prime surfaces in direct contact bond with concrete.

4. Apply extra coat to corners, welds, edges, and fasteners.

D. Shop Painting: Comply with SSPC-PA 1.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Anchor metal fabrications to substrates indicated; provide all fasteners required.

B. Perform all field fabrication required for installation.

1. Fit joints tightly.

2. Weld joints as indicated.

a. Weld in accordance with AWS code.

b. Exposed welds: Grind flush and smooth.

C. Install items in correct location, plumb and level, without rack or warp.

D. Provide temporary supports and bracing as required.

3.2 CLEANING AND TOUCH-UP

A. Touch up shop paint immediately after erection.

1. Clean field welds, bolted joints, and areas where primer is damaged.

2. Paint with material used for shop painting, minimum 2 mils dry film thickness.

END OF SECTION 05500

SECTION 05521 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Pipe and tube railings.
 - 2. Miscellaneous metal fabrications.
 - 3. Shop coatings.
 - 4. Stair handrails at all stairs, including wall brackets, escutcheons and attachments.
- B. Related Sections:
 - 1. Blocking for handrail attachments: Division 6.
 - 2. Painting: Division 9.

1.3 REFERENCES

- A. ASTM A 53-90b -- Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless; 1990.
- B. ASTM A 123-89a -- Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 1989.
- C. ASTM A 500-92 -- Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 1992.
- D. AWS D1.1-92 -- Structural Welding Code -- Steel; American Welding Society; 1992.
- E. AWS D1.3-89 -- Structural Welding Code--Sheet Steel; American Welding Society; 1989.
- F. FS FF-B-561D -- Bolts, (Screw), Lag; 1989.
- G. FS FF-S-111D -- Screw, Wood; 1974.
- H. FS FF-W-84A -- Washers, Lock (Spring); 1967 (Amended 1980).

- I. FS FF-W-92B -- Washer, Flat (Plain); 1974.
- J. FS TT-P-664D -- Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC-Compliant; 1988.
- K. SSPC-PA 1 -- Shop, Field, and Maintenance Painting; Steel Structures Painting Council; 1991.
- L. SSPC-SP 1 -- Solvent Cleaning; Steel Structures Painting Council; 1982.
- M. SSPC-SP 3 -- Power Tool Cleaning; Steel Structures Painting Council; 1989.
- N. SSPC-SP 5 -- White Metal Blast Cleaning; Steel Structures Painting Council; 1991.
- O. SSPC-SP 6 -- Commercial Blast Cleaning; Steel Structures Painting Council; 1991.
- P. SSPC-SP 8 -- Pickling; Steel Structures Painting Council; 1991.
- Q. SSPC-SP 10 -- Near-White Blast Cleaning; Steel Structures Painting Council; 1991.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance Requirements: Where complete sizes or dimensions of structural members, connections, or fasteners of any item are not indicated, design the item to produce strength appropriate to the use intended.
- B. Handrails: Design to resist the loads specified by applicable building code(s).

1.5 SUBMITTALS

- A. Shop Drawings: For each fabricated item, show the following:
 - 1. Plans and elevations.
 - 2. Jointing and connections.
 - a. Indicate welded connections using standard AWS symbols; indicate net weld length.
 - 3. Profiles of sections and reinforcing.
 - 4. Fasteners and anchors.
 - 5. Accessories.
 - 6. Location of each finish.

1.6 QUALITY ASSURANCE

- A. Where fabrications are specified to comply with specific structural performance requirements, provide design sealed by a professional engineer registered in the state in which the project is located.

1.7 JOB CONDITIONS

- A. Fit fabrications accurately to actual construction. Record field measurements on shop drawings.

PART 2 - PRODUCTS

2.1 MATERIALS - METALS

- A. Steel Shapes:
 - 1. Pipe: Schedule 40 1 1/4" nominal diameter.

2.2 MATERIALS - MISCELLANEOUS

- A. Fasteners: Use fasteners suitable for the material being fastened and for the type of connection required.
 - 1. For exterior use or built into exterior walls: Nonferrous stainless steel, zinc coated or cadmium plated.
 - 2. Use fasteners of same material as items being fastened unless otherwise indicated.
 - 3. Lag bolts: FS FF-B-561.
 - 4. Wood screws: FS FF-S-111.
 - 5. Plain washers: FS FF-W-92.
 - 6. Lock washers: FS FF-W-84.
- B. Shop Primer: Rust-inhibitive, lead and chromate free, low VOC primer, complying with FS TT-P-664, or equivalent.

2.3 FABRICATION - GENERAL

- A. Fabricate and shop-assemble in largest practical sections for delivery to site.
 - 1. Prepare and reinforce fabrications as required to receive applied items.
 - 2. Fabricate items with joints tightly fitted and secured.
 - 3. Make exposed joints tight, flush, and hairline.

- B. Fasteners: Use concealed fasteners if possible.
 - 1. Exposed fasteners: Flathead, countersunk type unless otherwise indicated.
- C. Anchors: Fabricate to suit conditions indicated; use anchors of same material and finish as item except where specifically indicated otherwise.
- D. Welding:
 - 1. Welding of steel: Comply with AWS D1.1 recommendations.
 - 2. Provide continuous welds at welded corners and seams.
 - 3. Exposed welds: Grind flush and smooth.

2.4 FABRICATION - RAILINGS

- A. Railings - General: Construct as indicated.
 - 1. Preassemble in shop to maximum extent practicable.
 - 2. Bending of members: Use jigs to make each similar configuration the same; make neat bends without other deformation.
 - 3. Close exposed open ends of members using same material as used in member.
 - 4. Provide all components necessary for assembly of railings and for attachment to other work.
 - a. For anchoring to stud partitions: Use fittings fastened with lag bolts to wood backing between studs.
- B. Steel Pipe/Tube Railings:
 - 1. Round steel tubing, cold-formed.
 - 2. Shop prime.
 - 3. Connections: Welded and ground.
 - 4. Welding: Fill joints completely and grind off flush.
 - 5. Elbows: Bent or mitered.
 - 6. Tee and cross intersections: Coped and welded.
 - 7. Ends: Turn all ends to wall beyond code required extensions.

2.5 FABRICATION - SHOP COATINGS

- A. Shop prime all iron and steel fabrications except exterior rails.
- B. Prepare surfaces to be coated as follows:
 - 1. Solvent-clean in accordance with SSPC-SP 1.
 - 2. Interior fabrications: Clean in accordance with SSPC-SP 3, SSPC-SP 5, SSPC-SP 6, SSPC-SP 8, or SSPC-SP 10.

- C. Shop Priming: Comply with SSPC-PA 1.
 - 1. Apply primer immediately following surface preparation.
 - 2. Do not prime surfaces to be welded.
 - 3. Do not prime surfaces in direct contact bond with concrete.
 - 4. Apply extra coat to corners, welds, edges, and fasteners.
- D. Shop Painting: Comply with SSPC-PA 1.
- E. All exterior pipe rails to be hot dipped galvanized.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- A. Anchor metal fabrications to substrates indicated; provide all fasteners required.
- B. Perform all field fabrication required for installation.
 - 1. Fit joints tightly.
 - 2. Weld joints as indicated.
 - a. Weld in accordance with AWS code.
 - b. Exposed welds: Grind flush and smooth.
- C. Install items in correct location, plumb and level, without rack or warp.
- D. Provide temporary supports and bracing as required.

3.2 INSTALLATION - RAILINGS

- A. Align joints before anchoring railing.
- B. Verify that posts are plumb before anchoring.

3.3 CLEANING AND TOUCH-UP

- A. Touch up shop paint immediately after erection.
 - 1. Clean field welds, bolted joints, and areas where primer is damaged.
 - 2. Paint with material used for shop painting, minimum 2 mils dry film thickness.

END OF SECTION 05521

DIVISION 6
Wood & Plastics



SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUBMITTALS

- A. Submittals: Submit the following:
 1. Product Data for engineered wood products (LVL & PSL), underlayment, exterior sheathing, air-infiltration barriers, metal framing anchors and connectors, and construction adhesives.
 2. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses.
 3. Wood treatment data, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials.
 4. Research or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence code compliance of engineered wood products, foam-plastic sheathing, air-infiltration barriers, metal framing anchors, power-driven fasteners, and fire-retardant-treated wood.
 5. Foam sealant product literature with explanation of installation locations.

PART 2 - PRODUCTS

- A. Lumber, General: Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by the American Lumber Standards Committee's (ALSC) Board of Review. Provide dressed lumber, S4S, with each piece factory marked with grade stamp of inspection agency.
 1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps and provide grade-compliance certificates issued by inspection agency.
 2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.
 3. See Structural Notes on drawings for material information.

- B. Pressure-Treated Framing Materials for above ground application: Preservative treatment shall be Wolmanized L³ Outdoor wood.
 - 1. Use Pressure Treated lumber only where shown on the plans. Pressure treated lumber is required for exposed framing, on exterior (perimeter) foundation walls, and on slabs-on-grade.
 - 2. All hangers, connectors, and fasteners in contact with PT lumber shall be electroplated galvanized (Simpson standard or equal).
 - 3. Apply field treatment to cut surfaces of PT lumber. Inspect each piece of lumber or plywood and discard damaged or defective pieces.

- C. Pressure-Treated Materials for below grade application: Preservative treatment shall be Alkaline Copper Quat (ACQ) with no ammonia. Verify that ammonia has not been used in the treatment process.
 - 1. Use Pressure Treated plywood only where shown on the plans. Pressure treated plywood is required for sheathing at courtyard.
 - 2. Apply field treatment to cut surfaces of PT plywood. Inspect each piece of plywood and discard damaged or defective pieces.

- D. Dimension Lumber: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.
 - 1. Non-Load-Bearing Interior Partitions: Provide Stud or No. 2 grade of the following species:
 - a. Species: Spruce-Pine-Fir South (SPFs); NELMA.
 - b. Species: Spruce-Pine-Fir (SPF) NLGA.
 - 2. Load bearing Framing: See Structural Notes on Drawings.

- E. Miscellaneous Lumber:
 - 1. Provide No. 2 grade or better lumber of any species for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, and similar members.
 - 2. Provide No. 2 grade or better lumber for all blocking of trim to be covered with aluminum coil stock.

- F. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that evidence compliance with building code in effect for Project. Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.
1. Laminated-Veneer Lumber (LVL) beams & headers: Lumber manufactured by laminating wood veneers in a continuous press using an exterior-type adhesive complying with ASTM D 2559 to produce members with grain of veneers parallel to their lengths and complying with the following requirements:
 - a. Extreme Fiber Stress in Bending: 2900 psi for 12-inch nominal- (286-mm actual-) depth members.
 - b. Modulus of Elasticity: 2,000,000 psi.
 2. Parallel-Strand Lumber (PSL) beams & headers: Lumber manufactured by laying up wood strands using an exterior-type adhesive complying with ASTM D 2559, and cured under pressure to produce members with grain of strands parallel to their lengths and complying with the following requirements:
 - a. Extreme Fiber Stress in Bending: 2900 psi (20 MPa) for 12-inch nominal- (286-mm actual-) depth members.
 - b. Modulus of Elasticity: 2,000,000 psi (13 800 MPa).
 3. LVL & PSL posts: $E = 1,700,000$ psi. $F_c = 2,600$ psi. Versa-Lam or Parallam or approved equal.
- G. Wood-Based Structural-Use Panels: Provide either all-veneer, mat-formed, or composite panels complying with DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels," unless otherwise indicated. Provide plywood panels complying with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood," where plywood is indicated.
1. Trademark: Factory mark structural-use panels with APA trademark evidencing compliance with grade requirements.
 2. Span Ratings: Provide panels with span ratings required to suit support spacing indicated.
 3. Subflooring: Advantech, no substitutes, APA-rated sheathing, Exposure 1.
 4. Exterior Wall Sheathing: APA-rated sheathing, Exposure 1.
 5. Roof Sheathing: APA-rated sheathing, Exposure 1.

6. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fire-retardant-treated plywood panels with grade, C-D Plugged Exposure 1, in thickness indicated or, if not otherwise indicated, not less than 15/32 inch (11.9 mm) thick.
 7. Plywood Underlayment for Resilient Flooring: Patriot Timber Products; SurePly Premium Underlayment or USG Fiberock Aqua-Tough.
 8. Fiberboard Underlayment: Homasote, 440 Sound Barrier, 1/2" thickness.
- H. Air-Infiltration Barrier: DuPont Tyvek Commercial Wrap, Class A smoke and flame spread per ASTM E-84-97a, 2.7 oz/yd² material weight, Water penetration resistance AATCC-127: 280 cm. Wide roll widths to be provided. Note: DuPont Tyvek Housewrap is not acceptable.
1. Seam Tape: DuPont Tyvek weatherization tape, 2-inch width, permanent acrylic adhesive.
 2. Bituminuous Flashing Tape:
 - a. Flex-Wrap Tape: DuPont Tyvek FlexWrap constructed of Tyvek, elastic material polyolefin film and highly adhesive self-sealing butyl, designed to mold and form corners.
 - b. Straight-Flash Tape: DuPont Tyvek FlexWrap constructed of Tyvek and highly adhesive self-sealing butyl, designed for straight run applications.
- I. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, in PT lumber, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.
1. Power-Driven Fasteners: CABO NER-272.
 2. Lag Screws & Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers. Hot dipped galvanized at PT lumber.
- J. Metal Framing Anchors(Hangers, Clips, etc.): Provide galvanized steel framing anchors of structural capacity, type, and size indicated and as follows:
1. Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with building code in effect for Project.

2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.
 3. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 (ASTM A 653M, Z180) for interior non-PT lumber. Coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated. G185 galvanized (Simpson Z-Max or equal) at exterior and at PT lumber.
 4. Powder-Actuated Fasteners: Ramset with "RamGuard" coating for corrosion resistance where used with PT lumber. Fasteners must be tested and approved for use in PT lumber.
- K. Fire-Retardant Treatment:
1. Fire-retardant treated lumber: AWPA C20.
 - a. Research or Evaluation Reports: Provide fire-retardant-treated wood acceptable to authorities having jurisdiction and for which a current model code research or evaluation report exists that evidences compliance of fire-retardant-treated wood for application indicated. Code research or evaluation stating appropriate treated-wood property modification factors must be submitted to and approved in writing by Engineer of Record.
 2. Fire-retardant treated plywood: AWPA C27.
 3. Treat the following items:
 - a. Exterior wall framing lumber.
 - b. Exterior wall sheathing.
 - c. Electrical and telephone backer boards.
 - d. Wall panels as indicated on the drawings.
 4. Provide treatment classified for use as Interior Type A, Low Hygroscopic.
- L. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.
- M. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.
- N. Foam sealant for sealing sill plates and all gaps between studs of wall panels: Great Stuff Pro, Wall & Floor Construction Adhesive.

PART 3 - EXECUTION

- A. Foam sealant applications.
 - 1. All exterior wall sill plates to be set in bed of foam sealant.
 - 2. All joints between studs of adjoining exterior wall panels shall have foam sealant installed between adjoining studs.
 - 3. Any voids in the exterior wall that are inaccessible after the framing is complete shall have the void completely filled with foam sealant during framing.

- B. Framing coordination.
 - 1. All corners of the exterior walls shall be configured so insulation may be installed in the corner after framing is complete, except as detailed otherwise in the structural drawings at the ends of shear walls.
 - 2. At all connections of the exterior wall and interior walls the wall studs of the exterior wall shall be configured to allow the installation of insulation behind the intersection of the walls, except as detailed otherwise in the structural drawings at the ends of shear walls.

- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.

- D. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.

- E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. CABO NER-272 for power-driven nails.
 - 2. Published requirements of metal framing anchor manufacturer.
 - 3. "Table 2304.9.12--Fastening Schedule" of the International Building Code 2000.

- F. Install stair framing as indicated.
 - 1. Cut stringers accurately to depth required by treads and risers; do not over cut, nor reduce remaining depth of stringer below 3-1/2 inches.
 - 2. Width of adjacent treads or height of adjacent risers: 3/16 inch.
 - 3. Variation within each run between largest and smallest treads and risers: 3/8 inch.

- G. Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.

- H. Countersink nail heads on exposed carpentry work and fill holes with wood filler.
- I. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
- J. Installation of Structural-Use Panels: Comply with applicable recommendations contained in APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
 - 1. Comply with "Code Plus" provisions of above-referenced guide.
 - 2. Fastening Methods: Fasten panels as indicated below:
 - a. Subflooring: Glue and nail to framing throughout.
 - b. Sheathing: Nail to framing.
 - c. Underlayment: Nail or staple to subflooring.
- K. Air-Infiltration Barrier: Cover sheathing with air-infiltration barrier strictly following manufacturer's written instructions.
 - 1. Install after the window installation.
 - 2. Apply air-infiltration barrier to cover upstanding flashing with 4-inch (100-mm) overlap.
- L. Field Quality Control: The Owner will employ a testing agency to perform inspections and to submit inspection reports. Inspections shall satisfy requirements of Schedule of Special Inspection Services prepared by Engineer of Record.

END OF SECTION 06100

SECTION 06192 - METAL-PLATE-CONNECTED WOOD TRUSSES

1.1 RELATED DOCUMENTS

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

1.2 GENERAL

- A. Structural Performance: Engineer, fabricate, and erect metal-plate-connected wood trusses to withstand design loads without exceeding ANSI/TPI-1 deflection limits or those shown on structural drawings.
- B. Engineering Responsibility: Engage a fabricator who uses a qualified professional engineer to prepare calculations, Shop Drawings, and other structural data for metal-plate-connected wood trusses.
- C. Submittals: In addition to Product Data, submit Shop Drawings detailing location, pitch, span, camber, configuration, and spacing for each type of truss required; lumber species, sizes, and stress grades; connector plate size, material, finish, design values, and orientation and location; and bearing details. Calculations must include member CSI ratios, member forces, actual dead and live load deflections, reactions, and plate sizes.
 - 1. Include truss Erection Drawings on 24"x36" sheets (min.) and structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include all connection hardware on shop drawings.
- D. Fabricator's Qualifications: Engage a fabricator who participates in a recognized quality-assurance program that involves inspection by.; Truss Plate Institute (TPI); or other independent inspecting and testing agency acceptable to authorities having jurisdiction and Engineer.
- E. Comply with applicable requirements and recommendations of ANSI/TP1 1, "National Design Standard for Metal-Plate-Connected Wood Truss Construction," and TPI Publication Building Component Safety Information (BCSI) 1-03 "Guide to Good Practice for Handling, Installing, and Bracing of Metal Plate Connected Wood Trusses."
- F. Wood Structural Design Standard: Comply with applicable requirements of AFPA's "National Design Specification for Wood Construction" and its "Supplement."

- G. Single-Source Engineering Responsibility: Provide trusses engineered by metal-plate connector manufacturer to support superimposed dead and live loads indicated, with design approved and certified by a qualified professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in the design of metal-plate-connected wood trusses. Truss to truss connections shall be included in design.
- H. Handle and store trusses with care and comply with manufacturer's written instructions and TPI recommendations to avoid damage and lateral bending.

1.3 PRODUCTS

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Grade and Species: Provide dimension lumber of any species for truss chord and web members, graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AFPA's "National Design Specification for Wood Construction" and its "Supplement."
- C. Metal Connector Plates: Fabricate connector plates from structural-quality steel sheet, zinc coated by hot-dip process complying with ASTM A 653, G60 coating designation; Grade 33 and not less than 0.0359 inch thick.
- D. Fasteners: Provide fasteners of size and type indicated that comply with requirements specified below for material and manufacture. Where truss members are exposed to weather or to high relative humidities, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of stainless steel, Type 304 or 316.
 - 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. Lag Bolts and Screws: ASME B18.2.1.
 - 5. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- E. Metal Framing Anchors: Provide metal framing anchors with allowable design loads, as published by manufacturer, that meet or exceed those indicated, of the following metal and finish:

1. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.
- F. Assemble truss members in design configuration indicated using jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances of ANSI/TPI 1. Position members to produce design camber indicated.
 1. Fabricate wood trusses within manufacturing tolerances of ANSI/TPI 1.
- G. Connect truss members by metal connector plates located and securely embedded simultaneously into both sides of wood members by air or hydraulic press.
- H. Minimum member size used in any truss shall be 2"x4" nominal. All members shall be Grade #2 or better. Minimum plate size in roof trusses shall be 3"x4" to accommodate handling stresses.
- I. Truss manufacturer shall be approved by Engineer prior to selection.
- J. All compression webs requiring lateral bracing must be tagged on the actual truss by the manufacturer at each bracing location. Failure to do so will require field tagging by the manufacturer.

1.4 EXECUTION

- A. Install and brace trusses according to recommendations of TPI BCSI 1-03 Summary Sheet. Space trusses as indicated; install plumb, square, and true to line; and securely fasten to supporting construction.
- B. Lift trusses at designated lifting points only.
- C. Anchor trusses securely at all bearing points using metal framing anchors and fasten according to metal framing anchor manufacturer's fastening schedules and written instructions.
- D. Securely connect each truss ply required for forming built-up girder trusses. Anchor trusses to girder trusses as indicated.
- E. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
- F. Install wood trusses within installation tolerances of ANSI/TPI 1.

- G. Do not alter, cut, or remove truss members.
- H. Temporary bracing of wood trusses is solely the responsibility of the contractor. Refer to TPI publication BCSI 1-03 for all necessary temporary bracing.
- I. Return wood trusses that are damaged or do not meet requirements to fabricator and replace with trusses that do meet requirements.
- J. Field Quality Control: The Owner will employ a testing agency to perform inspections and to submit inspection reports. Inspections shall satisfy requirements of Schedule of Special Inspection Services prepared by Engineer of Record.

END OF SECTION 06192

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior finish carpentry.
 - 2. Standing/running trim.
 - a. Items as indicated.
 - 3. Interior finish carpentry.
 - a. Standing/running trim.
 - b. Items as indicated.
- B. Related Sections:
 - 1. Blocking and grounds for attachment of woodwork: Elsewhere in Division 6.
 - 2. Wood windows with operating sash: Division 8.
 - 3. Wood doors: Division 8.
 - 4. Field finishing of woodwork: Division 9.
 - 5. Manufactured casework and its tops: Division 12.

1.3 REFERENCES

- A. ANSI A208.1-1989 -- Wood Particleboard; 1989.
- B. ASTM A 153-82(87) -- Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 1982 (Reapproved 1987).
- C. ASTM D-3359 – Adhesion.
- D. ASTM D522 – Flexibility (Cylindrical Mandrel)
- E. ASTM D-3363 – Hardness (Pencil)
- F. ASTM B-117 – Salt Spray.
- G. ASTM D-4585 – Humidity.

- H. ASTM D-2794 – Impact Resistance.
- I. AWWPA P5-91 -- Standards for Waterborne Preservatives; American Wood-Preservers' Association; 1991.
- J. HPMA HP 1983 -- American National Standard for Hardwood and Decorative Plywood; Hardwood Plywood Manufacturers Association; 1983.
- K. NBS PS 1-83 -- Construction and Industrial Plywood; U.S. Department of Commerce/National Bureau of Standards; 1984.
- L. NBS PS 20-70(86) -- American Softwood Lumber Standard; U.S. Department of Commerce/National Bureau of Standards; 1970 (Amended 1986).
- M. NEMA LD 3-1991 -- High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 1991.
- N. Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 1990.
- O. WM 4-77 -- General Requirements For Wood Moulding; Wood Moulding and Millwork Producers (WMMP); 1985 (part of WM 7-88).

1.4 SUBMITTALS

- A. Manufactured Wood Products:
 - 1. Product data.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials for exterior woodwork under cover, off the ground, and supported to prevent warpage.
- B. Store materials for interior woodwork indoors in air conditioned spaces maintained within design temperature and humidity range.
- C. Treated Wood Products: Handle and store as recommended by treatment manufacturer.

1.6 PROJECT CONDITIONS

- A. Maintain final design temperature and humidity in areas where woodwork is installed.

- B. Fit woodwork to actual construction. If it is not possible, or practical, to take field measurements before fabricating, provide adequate installation tolerances and scribe or trim to fit.
- C. Coordinate installation of woodwork with other work to avoid damage.
- D. Coordination Data:
 - 1. Furnish treatment manufacturer's instructions for fabrication, handling, storage, installation, and finishing of treated wood materials to fabricators and installers.

PART 2 - PRODUCTS

2.1 WOODWORK

- A. Stair Wall Caps :
 - 1. Lumber species: Poplar.
 - a. Grade: Paint Grade.
 - 2. Finish: Opaque finish specified elsewhere.
 - 3. Screwed, countersunk and plugged.
- B. Window, door and misc. moldings :
 - 1. Lumber species: Pine: sugar, ponderosa.
 - a. Grade: NLMA's grading for paint grade material.
 - 2. Finish: Opaque finish specified elsewhere.
 - 3. Face-nail, countersink, and fill.
 - 4. Fingered jointed material may be used. Mitered joints at all corners. Picture frame at windows.
 - 5. All Casing: Brosco 8308 2 Round Corner Casing,
- C. Molding and Trim :
 - 1. Manufacturer based on Brosco. Others may be submitted for approval.
 - 2. Chair Rail (where shown): 8630 w/ flat shim to match wainscoting thickness where present. Provide 1x PVC behind when not with wainscoting below. Shim PVC strip for flat face. Caulk gaps between PVC and drywall.
 - 3. Wood Base; Brosco B688 Base.
 - 4. Scotia: 8059 under all wall caps and countertop overhangs.
 - 5. Crown in Common Areas including Suspended Acoustical Ceilings: 8027.
 - 6. Cased Opening Casing: 8308 2 Round Corner w/ 1x wood frame.
- D. Shelving and Closet Rod :
 - 1. Closet Rod: Brosco 8913, painted to match casing.

2. Shelving: 3/4" MDF w/ bullnose front edge, painted to match casing.
3. Center bracket of clothes rods over 3'-0" long: 3/4" MDF panel with bullnose front edge. 45° angle to wall with hole for clothes rod support. Provide cleat at wall with blocking behind.

E. Exterior Brackets:

1. Fypon, BKT10X12X4.
2. install with long dimension horizontal.
3. Provide adhesive as recommended by manufacturer.

F. Exterior Deck Rails:

1. Provide one of the following:
 - a. Nebraska Plastics, Country Estate Fence & Railing, American Aluminum Series; T-Rail, 42" high. Local supplier: Bridgewater Poly Vinyls, 508-697-7050.
 - b. Superior Aluminum Railing; Series 900 EE railing system with 901 top rail.
 - c. An equal product of another manufacturer may be submitted for approval.
 - d. A custom aluminum rail system matching manufactured rail systems above may be provided. Provide shop drawings for approval of railing system.
2. Rail to span balcony opening with out intermediate post to meet code required strength.
3. Custom color factory finished or provide unfinished for shop applied finish as follows:
 - a. Duncan; Thermoset, high performance, dry applied polyester material.
 - b. Coating warrantee: 1 year.
 - c. Submit 3"x6" samples of factory-applied coatings and colors proposed for use for approval prior to coating application.
 - d. Shop-applied metal coatings shall be performed in a facility acceptable to the coating manufacturer.
 - e. Prepare metal and apply coating following manufacturer's recommendations.
 - f. Handle and install materials with shop-applied coatings as recommended by coating manufacturer to prevent damage to coatings prior to and after installation.
 - g. Touch-up shop-applied metal coatings and recommended by coating manufacturer.
 - h. Coatings not matching approved submittals shall be removed and replaced at no additional expense to the Owner.
4. Concealed fasteners or color matched to rail.
5. Provide necessary accessories for a complete installation.

- G. Composite Wood Decking:
 1. Trex Accents; 5/4x6 Decking Planks.
 2. Provide FastenMaster IQ Hidden Fastening System or Tiger-Claw TC-3 Composite Fastener.
 3. Submit colors for selection during the submittal process. Allow for three color selections.

- H. Vinyl Privacy Lattice:
 1. Genova Products; Choice Lattice, Privacy w/ U-Channels & H-Channels.
 2. Permalatt Products, Inc; Vinyl Lattice, 1" Diagonal w/ U-Channels & H-Channels.
 3. Color to be selected from standard colors during construction.
 4. Provide accessories for a complete installation.

- I. Decorative Black Steel Gate at Courtyard Entrances:
 1. Certainteed; Prestige, Thru-Picket Gate w/ pyramid finial caps.
 2. Provide additional hardware as needed to fasten to masonry.
 3. Gate to have simple latching hardware operable from courtyard side.

2.2 WOOD MATERIALS

- A. Lumber: Species and grade as indicated; lumber ready for installation shall comply with WM 4, "General Requirements For Wood Molding," Wood Molding and Millwork Producers (WMMP).
 1. Softwood: Comply with NBS PS 20 and grade in accordance with the grading rules of the grading and inspection agency applicable to the species.
 2. Hardwood: Grade in accordance with National Hardwood Lumber Association grading rules.
 3. For transparent finish, use only solid pieces of lumber; WM 4 N-grade.
 4. For opaque finish, pieces which are glued up may be used; WM 4 N- or P-grade.
 5. Where glued-up lumber is used on exterior, use waterproof adhesive.
 6. Moisture content: Comply with requirements of specified inspection agencies and with manufacturer's written recommendations for moisture content of finish carpentry at relative humidity conditions existing during time of fabrication and in installation areas. Provide kiln-dried lumber.
 7. Provide lumber dressed on all exposed faces, unless otherwise indicated.
 8. Do not use twisted, warped, bowed, or otherwise defective lumber.
 9. Sizes indicated are nominal, unless otherwise indicated.

10. Do not mark or color lumber, except where such marking will be concealed in finish work.

B. Particleboard: ANSI A208.1, 1-M-2 or 2-M-2, or better.

2.3 MISCELLANEOUS MATERIALS

A. Wood Filler for Transparent Finish Woodwork: Match final finish color.

B. Primer: As specified in Division 9.

C. Fasteners: Style, size, material, and finish as required for the purpose.

1. For exterior use with transparent finished woodwork: Stainless steel, cadmium plated, or aluminum.

2. For exterior use with opaque finished woodwork: Nonferrous metal, stainless steel, or steel hot-dip galvanized in accordance with ASTM A 153.

D. Aluminum drip flashing and trim flashing:

1. Standard .032 vinyl coated aluminum sized for flashed trim members.

2.4 FABRICATION

A. Fabricate in sizes and shapes indicated and using details indicated.

B. Complete fabrication and assembly in shop.

1. Edges and trim to be scribed to fit may be left loose.

2. Ease edges of solid lumber members where indicated, using:

a. 1/16-inch radius for members 1 inch or less nominal thickness.

b. 1/8-inch radius for members more than 1 inch nominal thickness.

C. Work preservative-treated wood in accordance with treatment manufacturer's recommendations; treat cut surfaces as recommended by treatment manufacturer.

D. Where woodwork is indicated to be field finished, sand smooth, fill nail holes, clean thoroughly, and otherwise prepare for finishing.

E. Standing and Running Trim: Miter exposed ends of members to match profile.

1. Rout out backs of flat members over 2 inches wide, unless ends are exposed.

2. Kerf backs of flat members over 4 inches wide, except where ends are exposed.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Verify that blocking and backings have been installed at appropriate locations for anchorage.
- B. Prime the concealed surfaces of exterior woodwork which is to be painted, using methods specified in painting section in Division 9.

3.2 INSTALLATION - GENERAL

- A. Do not begin installation of interior woodwork until potentially damaging construction operations are complete in the installation area.
- B. All items shall be installed following manufacturer's installation instructions.
Make joints neatly, with uniform appearance.
- C. Install woodwork in correct location, plumb and level, without rack or warp.
 - 1. Where adjoining surfaces are flush, install with maximum 1/16-inch offset.
 - 2. Where adjoining surfaces are separated by a reveal, install with maximum 1/8-inch offset.
- D. Conceal all shims.
- E. Cut woodwork precisely to fit.
- F. Tightly fit joints in exterior woodwork or otherwise arrange to shed water.
- G. Secure woodwork to substrate.
 - 1. On Lower Level where Type 1 construction is required, secure molding to substrate with adhesive. Wood blocking in walls at this level is not permitted.
 - 2. Where anchorage method is not indicated, conceal all fasteners where possible.
 - 3. Where exposed nailing is required or indicated, use finishing nails, countersink, and fill. Provide blocking where permitted.
- H. Preservative-Treated Wood: Fabricate and install as recommended by treatment manufacturer.
 - 1. Treat lumber cut in field as specified under Fabrication.

- I. Repair damaged and defective woodwork to eliminate visual and functional defects; where repair is not possible, replace woodwork.
- J. Standing and Running Trim: Use longest pieces available and as few joints as possible.
 - 1. Stagger joints in built-up trim members.
 - 2. Use diagonal (scarfed) joints in lengths of trim.
 - 3. Install boards cut with flat grain so bark side is exposed.
 - 4. Cope or miter at inside corners and miter at outside corners; fit tightly.
 - 5. Allowed variation in plumb and level: Not more than 1/8 inch in 8 feet.

3.3 CLEANING

- A. Clean exposed surfaces.

3.4 PROTECTION

- A. Protect woodwork from damage and maintain design environmental conditions.

END OF SECTION 06200

SECTION 06415 - STONE COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes stone countertops.
- B. Related Sections:
 - 1. Division 15 Section for sink units mounted in countertops.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Each variety of stone. Include data on physical properties required by referenced ASTM standards.
 - 2. Stone accessories and other manufactured products.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.
- C. Samples for Verification:
 - 1. Provide samples prior to bidding project to verify granite quality expected.
 - 2. For each stone type indicated, in sets of Samples not less than 12 inches (300 mm) square. Include two or more Samples in each set and show the full range of variations in appearance characteristics expected in completed Work.
- D. Qualification Data: For installer and fabricator.
- E. Maintenance Data: For stone countertops to include in maintenance manuals. Include Product Data for stone-care products used or recommended by Installer, and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate stone countertops similar to that indicated for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.
- C. Source Limitations for Stone: Obtain each variety of stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.
 - 1. Obtain each variety of stone from a single quarry, whether specified in this Section or in another Section of the Specifications.
 - 2. Stone slabs to be consistent with samples submitted.
- D. Mockup: Build mockup to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockup of typical countertop as shown on Drawings.
 - 2. Approved mockup may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Lift stone with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone, if required, using dollies with cushioned wood supports.
- B. Store stone on wood A-frames or pallets with nonstaining separators and nonstaining, waterproof covers. Ventilate under covers to prevent condensation.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of construction to receive stone countertops by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide the following countertops for the unit Kitchen:
 - 1. Base countertop with white shaker cabinets: Honed Absolute Black Granite, 1 1/4".
 - 2. Option 1 countertop with dark cherry euro style cabinets : Carrara Marble, Bianco polished, 1 1/4".
 - 3. Option 2 countertop with light cherry euro style cabinets : Green Soapstone, polished, 1 1/4".
- B. Provide the following countertops for the unit Master Baths:
 - 1. Base countertop with dark cherry euro style cabinets : Carrara Marble, Bianco polished, 1 1/4".
 - 2. Option 1 countertop with white shaker cabinets: Honed Absolute Black Granite, 1 1/4".
 - 3. Option 2 countertop with light cherry euro style cabinets : Green Soapstone, polished, 1 1/4".
- C. Each countertop shall be provided with matching backsplash and side splashes.
- D. Cut stone from contiguous, matched slabs in which natural markings occur.

2.2 ADHESIVES, GROUT, SEALANTS, AND STONE ACCESSORIES

- A. General: Use only adhesives formulated for stone and ceramic tile and recommended by their manufacturer for the application indicated.
- B. Stone Joint Splines: Stainless-steel or brass washers approximately 1 inch (25 mm) in diameter and of thickness to fit snugly in saw-cut kerf in edge of stone units.
- C. Stone Cleaner: Cleaner specifically formulated for stone types, finishes, and applications indicated, as recommended by stone producer and, if a sealer is specified, by sealer manufacturer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.
- D. Stone Sealer: Colorless, stain-resistant sealer that does not affect color or physical properties of stone surfaces, as recommended by stone producer for application indicated.

2.3 STONE FABRICATION, GENERAL

- A. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.
 - 1. Repairs that are characteristic of the varieties specified are acceptable provided they do not impair structural integrity or function and are not aesthetically unpleasing, as judged by Architect.
- B. Grade and mark stone for final locations to produce assembled countertop units with an overall uniform appearance.
- C. Fabricate stone countertops in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.
 - 1. For granite, comply with recommendations in NBGQA's "Specifications for Architectural Granite."
 - 2. Clean sawed backs of stones to remove rust stains and iron particles.
 - 3. Dress joints straight and at right angle to face, unless otherwise indicated.
 - 4. Cut and drill sinkages and holes in stone for anchors, supports, and attachments.
 - 5. Provide openings, reveals, and similar features as needed to accommodate adjacent work.
 - 6. Fabricate molded edges with machines having abrasive shaping wheels made to reverse contour of edge profile to produce uniform shape throughout entire length of edge and with precisely formed arris slightly eased to prevent snipping, and matched at joints between units. Form corners of molded edges as indicated with outside corners slightly eased, unless otherwise indicated.
 - 7. Finish exposed faces of stone to comply with requirements indicated for finish of each type of stone required and to match approved Samples and mockups. Provide matching finish on exposed edges of countertops, splashes, and cutouts.
- D. Carefully inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

2.4 STONE COUNTERTOPS

- A. General: Comply with recommendations in MIA's "Dimension Stone - Design Manual."

- B. Nominal Thickness: Provide thickness indicated, but not less than 1 1/4". Gage backs to provide units of identical thickness.
- C. Edge Detail: Straight, slightly eased at top.
- D. Splashes: Provide 3/4-inch- (20-mm-) thick backsplashes and end splashes, unless otherwise indicated.
 - 1. Height: 4 inches (100 mm).
 - 2. Top-Edge Detail: Straight, slightly eased at corner.
- E. Joints: Fabricate countertops without joints.
- F. Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated and as follows:
 - 1. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints where indicated. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.
- G. Cutouts and Holes:
 - 1. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates indicated to receive stone countertops and conditions under which stone countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of stone countertops.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Advise installers of other work about specific requirements for placement of inserts and similar items to be used by stone countertop Installer for anchoring stone countertops. Furnish installers of other work with Drawings or templates showing locations of these items.

- B. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives. Allow stone to dry before installing.

3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/16 inch in 48 inches (1.5 mm in 1200 mm).
- B. Variation from Level: Do not exceed 1/8 inch in 96 inches (3 mm in 2400 mm), 1/4 inch (6 mm) maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/4 of nominal joint width.
- D. Variation in Plane at Joints (Lipping): Do not exceed 1/64-inch (0.4-mm) difference between planes of adjacent units.
- E. Variation in Line of Edge at Joints (Lipping): Do not exceed 1/64-inch (0.4-mm) difference between edges of adjacent units, where edge line continues across joint.

3.4 INSTALLATION OF COUNTERTOPS

- A. General: Install countertops over plywood subtops with full spread of water-cleanable epoxy adhesive.
- B. General: Install countertops by adhering to supports with water-cleanable epoxy adhesive.
- C. Do not cut stone in field, unless otherwise indicated. If stone countertops or splashes require additional fabrication not specified to be performed at Project site, return to fabrication shop for adjustment.
- D. Do necessary field cutting as stone is set. Use power saws with diamond blades to cut stone. Cut lines straight, true, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

- E. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Shim and adjust stone to locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances. Install anchors and other attachments indicated or necessary to secure stone countertops in place.
- F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Use power saws with diamond blades to cut stone. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

3.5 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean countertops as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately.
- B. Remove and replace stone countertops of the following description:
 - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
 - 2. Defective countertops.
 - 3. Defective joints, including misaligned joints.
 - 4. Interior stone countertops and joints not matching approved Samples and mockups.
 - 5. Interior stone countertops not complying with other requirements indicated.
- C. Replace in a manner that results in stone countertops matching approved Samples and mockups, complying with other requirements, and showing no evidence of replacement.
- D. Clean stone countertops not less than six days after completion of installation, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage stone.
- E. Sealer Application: Apply stone sealer to comply with stone producer's and sealer manufacturer's written instructions.

END OF SECTION 06415

DIVISION 7

Moisture Protection



SECTION 07131 – SPRAY APPLIED WATERPROOFING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Spray Applied waterproofing for below grade vertical waterproofing.
- B. Related Sections include the following:
 - 1. Division 3, Section 03300 "Cast-In-Place Concrete."

1.3 PERFORMANCE REQUIREMENTS

- A. Provide waterproofing that prevents the passage of water.

1.4 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
- B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, penetrations, inside and outside corners, and other termination conditions.
- C. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- D. Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations.
- E. Sample Warranty: Copy of special waterproofing manufacturer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who is licensed by waterproofing manufacturer to install manufacturer's products. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation. The individual shall have experience with multiple previous installations and competent to respond to concerns raised.
- B. Source Limitations: Obtain waterproofing materials through one source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.
- C. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- D. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
 - 1. Do not apply waterproofing in snow, rain, fog, or mist.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.
- C. Provide surfaces that are broom clean, dry, sound and free of voids, bugholes, rockpockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing membrane system.

- D. Using suitable abrasive methods, remove residue of form release, curing compound, chemical retarders and other surface treatments, laitance, mortar smear, sawcutting residue, mill scale, rust, loose material and other contaminants from concrete, masonry and ferrous metal surfaces to receive the work of this Section.

1.8 WARRANTY

- A. Special Manufacturer's Warranty: Written warranty, signed by waterproofing manufacturer agreeing to replace waterproofing material that does not comply with requirements or that does not remain watertight during specified warranty period.
 - 1. Warranty does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate exceeding 1/16 inch in width.
 - 2. Warranty Period: Submit maximum available warranty period for comparison and selection of product.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide the following waterproofing system applied to foundation walls in below grade situation product:
 - 1. Sierra Concepts, LLC: House Guard Waterproofing System.
 - 2. Tremco: Tremproof 260.
 - 3. Carlisle: CCW Barricoat liquid applied system.
 - 4. CETCO: StrataSeal SG
 - 5. Henry: AquaBloc WB liquid applied system.

2.2 SHEET DRAINAGE PANELS

- A. Insulation Drainage Board:
 - 1. House Guard System and Carlisle System: Dow; Styrofoam Perimate
 - a. Thickness: 1"
 - b. Compressive Pressure: At 1200 psf/ sq.ft. 4% compression.
 - c. Drainage Ability: 3 gal./min/foot
 - d. Thermal Resistance: R-5.
 - 2. Tremco System: TREMDrain DPI Board
 - a. Thickness: 3/4"
 - b. Drainage ability: 74 gal./hr/foot
 - c. Thermal Resistance: R-3.

3. CETCO System: Aduadrain 15XP & Aquadrain 100BD
 - a. Thickness: 7/16" & 1" respectively
 - b. Drainage ability: 20 gpm/ft. & 97 gpm/ft. respectively
4. Carlisle and Henry System: Owens Corning insulation System.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with membrane waterproofing.
 1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Substrate Patching: provide as recommended by manufacturer.
- C. Tremco Accessories:
 1. Joint backing: Closed-cell, polyethylene rod as recommended by membrane manufacturer.
 2. Joint Treatment products:
 - a. Dymeric 240-240FC; Tremco Inc.
 - b. Vulkem 227; Tremco Inc.
 - c. THC 900-901; Tremco Inc.
- D. Trowel Grade Mastic:
 1. CETCO Acceptable products:
 - a. M-2000 Liquid Flashing trowel-grade mastic.
 - b. StrataSeal TG
 - c. StrataSeal RG
 - d. CAT-7 Catalyst
 2. Carlisle Acceptable products:
 - a. Follow manufacturer's recommendations.
 3. Henry Acceptable products:
 - a. Follow manufacturer's recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification
 1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
 2. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.

4. Verify conformance with manufacturer's requirements;

3.2 SURFACE PREPARATION

- A. Clean, prepare and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.
- E. Prepare, fill, prime, and treat joints and cracks in substrates as recommended by manufacturer. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- F. With CETCO product at inside Corner Transitions: Install a 3/4" (19 mm) fillet of M-2000 Liquid Flashing at all horizontal and vertical inside corners. Then install M-2000 90-mil thick extending out from corner cant minimum 6" (150mm) on both sides.
- G. All exposed metal surfaces (pipes, sleeves, drains, vents, etc.) shall be clean. Remove oil, paint, rust, scales, or any other foreign matter before applying waterproofing.
- H. With CETCO product at penetrations: Seal around all applicable penetrations with minimum 90-Mil (2.3 mm) thick coat of M-2000 Liquid Flashing extending onto penetration and extending out a minimum 6" (150 mm) radius around the penetration.
- I. Corners: Prepare as recommend by manufacturer.
- J. With Carlisle products, follow manufacturers recommendations when treating all angle changes and penetrations.
- K. With Henry products, follow manufacturers recommendations when treating all angle changes and penetrations.

3.3 SPRAY APPLIED APPLICATION

- A. Install according to waterproofing manufacturer's written instructions and recommendations.
 - 1. Installed Thickness: 60 to 70 mils.
- B. Repair tears, voids, and lapped seams in waterproofing not complying with requirements.
- C. Install protection/insulation board over cured membrane in accord with manufacturer's instructions.

3.4 PROTECTION AND CLEANING

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Promptly remove primer or membrane system material from adjacent surfaces with MEK, Toluene or Xylene; leave work area in broom clean condition.

END OF SECTION 07131

SECTION 07140 – DECK WATERPROOFING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:
 - 1. Provide a complete polyurethane waterproofing membrane system including all applicable sealants and elastomeric flashings needed to prevent water penetration at decks. Refer to drawings for locations.
- B. Related work:
 - 1. Division 3, Section 03300 "Cast-In-Place Concrete."

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01330.
- B. Product data:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Shop Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades;
 - 4. Manufacturer's current recommended installation procedures which, when reviewed by Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 - 5. Written documentation of applicator's qualifications, including reference projects of similar scope and complexity, with current phone contacts of architects and owners for verification.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Applicator qualifications:
 - 1. Applicator shall have at least three years experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.
 - 2. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation.
- C. Convene a pre-installation job-site conference three weeks prior to commencing work of this Section:
 - 1. Secure attendance by Architect, Contractor, applicator, and authorized representatives of the membrane system manufacturer and interfacing trades.
 - 2. Examine Drawings and Specifications affecting work of this Section, verify all conditions, review installation procedures, and coordinate scheduling with interfacing portions of the Work.
- D. Materials: Obtain waterproofing and drainage materials from a single manufacturer to assure material compatibility.
- E. Materials: Obtain waterproofing and drainage materials from a single manufacturer to assure material compatibility

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in manufacturer's unopened containers with all labels intact and legible at time of use.
- B. Maintain the products in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.
- C. Comply with pertinent provisions of Section 01660.

1.6 SUBSTRATE CONDITIONS

A. General:

1. Provide applicator with surfaces that are broom clean, dry, sound and free of voids, bugholes, rockpockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing membrane system.
2. Using suitable abrasive methods, remove residue of form release, curing compound, chemical retarders and other surface treatments, laitance, mortar smear, sawcutting residue, mill scale, rust, loose material and other contaminants from concrete, masonry and ferrous metal surfaces to receive the work of this Section.

B. Concrete: Where work of this Section will be applied to concrete, provide surfaces that are smooth with finish equal to one that is light steel troweled followed by a fine hair broom.

C. Plywood: Where work of this Section will be applied to plywood, provide exterior grade plywood, 5/8" thick minimum, with A-side up, fastened with ring-shank nails.

D. Decks:

1. Slope deck surfaces to open edge or drains that have flanges at membrane level which are flush with deck surfaces.
2. Rigidly install pipe, vents and other surface protrusions, properly flash them, and cover to prevent entry of membrane materials.

E. Metal flashings: Where metal flashings are substrate to waterproofing membrane, set the flashings in continuous bedding bead of urethane sealant; install sealant S-bead between metal laps and mechanically fasten to substrate along leading edges at every 4" on center, staggered linearly, to lay flat without fishmouths.

F. Joints: Configuration shall be consistent with this Section and with all other requirements of the Contract Documents.

1.7 WARRANTY

- A. Deliver to the Architect signed copies of the following written warranties against defective materials and workmanship for a period of two years following date of completion. Warrant that installed waterproofing membrane system shall be free of defects including adhesive failure, cohesive failure, and waterproofing failure resulting from substrate cracking up to 1/16 inch.
 - 1. Manufacturer's standard warranty covering materials, minimum 5 years
 - 2. Applicator's standard warranty covering workmanship, minimum 2 years.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide one of the fluid applied elastomeric waterproofing membrane systems :
 - 1. Acceptable products:
 - a. Tremco Inc.: TREMproof 250 GC.
 - b. CETCO: LDC 60H.
 - c. Henry: AquaBloc WB, rubberized asphalt emulsion.
 - 2. Coal-tar free polyurethane designed for concealed building components subject to hydrostatic head;
 - 3. Complying with ASTM C836-89a.

2.2 ACCESSORIES

- A. Primer: As recommended by waterproofing membrane system manufacturer;
- B. Joint backing: Closed-cell, polyethylene rod as recommended by membrane manufacturer;
- C. Elastomeric sheet flashing: 1/16 inch thick by 12 inch wide uncured neoprene sheeting;
- D. Joint Treatment:
 - 1. Tremco Acceptable products:
 - a. Dymeric 240/240FC; Tremco Inc.
 - b. Vulkem 227; Tremco Inc.
 - c. TREMproof 201T; Tremco Inc.
 - d. or prior approved equal

- E. Trowel Grade Mastic:
 - 1. CETCO Acceptable products:
 - a. M-2000 Liquid Flashing trowel-grade mastic.

- F. Prefabricated Composite Drainage: Required when deck above is pavers.
 - 1. Tremco Acceptable products:
 - a. Acceptable product(s): Provide TREMDrain S 1/4" composed of a filter fabric laminated to free-draining high-density dimpled polystyrene drainage core.
 - 2. CETCO Acceptable products:
 - a. Aquadrain 10X.
 - 3. Henry Acceptable products:
 - a. Henry DB 200.

- G. Protection board: Required when deck above is installed with sleepers.
 - 1. Tremco Acceptable products:
 - a. Tremco 40 mil High Density Polyethylene with a double side tape on the outside edge.
 - 2. CETCO Acceptable products:
 - a. Aquadrain 30H.
 - 3. Henry Acceptable products:
 - a. 1/8 or 1/4 inch asphaltic protection board.

2.3 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the membrane system manufacturer as compatible, subject to review of the Architect.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with manufacturer's product data, including product application and installation instructions, as well as, manufacturer's shipping and storage recommendations.

3.2 SURFACE CONDITIONS

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

- B. Applicator shall examine the areas and conditions under which work of this Section will be performed.
 - 1. Verify conformance with manufacturer's requirements;
 - 2. Report unsatisfactory conditions in writing to the Architect;
 - 3. Do not proceed until unsatisfactory conditions are corrected.

- C. Concrete to receive waterproofing shall be of sound structural grade with a smooth finish, free of debris, oil, grease, laitance, dirt, release agent, curing compounds (except pure sodium silicate type), or other foreign matter which will impair the adhesion of the waterproofing. Structural concrete shall be cured a minimum of 14 days prior to membrane installation. Lightweight structural concrete requires a minimum of 21 days cure time prior to membrane installation.

3.3 PREPARATION

- A. Surface preparation and detailing procedures to be in accord with waterproof membrane system manufacturer's instructions and recommendations except where more stringent requirements are indicated.

- B. Clean all deck surfaces to receive membrane system in accord with manufacturer's instructions; vacuum clean or blow clean with oil-free compressed air all surfaces to receive sealants, detailing materials or membranes immediately prior to installation.

- C. Rout, clean, prepare and detail surface cracks in accord with manufacturer's instructions; install backer rod where required.

- D. Clean metal surfaces to bright metal by wire brushing or mechanical etching; scuff-sand lead flashing and plastic surfaces.

- E. Prime surfaces in accord with manufacturer's instructions.

- F. Install 1/4" diameter backer rod into corner of all horizontal-to-vertical junctures subject to movement and cover with 1" detail cant of approved sealant; install 1" detail cants at projections, curbs and other horizontal-to-vertical junctures.

- G. Install detail coats, joint and crack treatments, and liquid flashings in accord with manufacturer's instructions.

- H. Allow detail applications to cure in accord with manufacturer's instructions prior to general application of membrane.

3.4 APPLICATION

- A. General: Install waterproofing system in accord with manufacturer's recommendations and instructions as applies to the Work except where more stringent requirements are indicated.
 - 1. Waterproofing membrane shall have a minimum of 60 mil dry-film thickness.
 - 2. Grid deck surfaces to assure proper coverage rates and verify membrane wet-film mil thickness with gauges as work progresses.
 - 3. Retain empty product containers during course of work to aid in determining whether completed membrane complies with required average dry-film thickness.
- B. All non-moving cracks and joints over 1/8" (3 mm) in width shall be routed out to 1/4" (6 mm) minimum in width and depth, and then cleaned. Fill cleaned joint flush with polyurethane sealant. Allow sealant to cure before applying membrane waterproofing.
- C. With CETCO product at inside Corner Transitions: Install a 3/4" (19 mm) fillet of M-2000 Liquid Flashing at all horizontal and vertical inside corners. Then install M-2000 90-mil thick extending out from corner cant minimum 6" (150mm) on both sides.
- D. Verify proper dry condition of substrate using method recommended by membrane system manufacturer; perform adhesion checks prior to general application of membrane system using field adhesion test method recommended by manufacturer.
- E. Mask off adjoining surfaces not to receive membrane system.
- F. Wipe clean all detail coats with white rags wetted with Xylene solvent; do not saturate detail coat.
- G. Apply membrane uniformly and allow cure in accord with manufacturer's instructions.
- H. Feather terminating edge when entire area cannot be completed in one day; clean area 6" wide along terminating edge of membrane with Xylene solvent on clean white rags prior to startup on next working day; use interlaminary primer per manufacturer's instructions as needed; overlap existing work by 6" with new work.
- I. Install protection board or drainage board over cured membrane in accord with manufacturer's instructions.

3.5 PROTECTION AND CLEAN-UP

- A. Promptly remove primer or membrane system material from adjacent surfaces with MEK, Toluene or Xylene; leave work area in broom clean condition.
- B. Prohibit traffic over completed work and protect against work overhead until protection course is installed; protect from damage until protected beneath overlaying work.

END OF SECTION

SECTION 07148 – GREEN ROOF/PLAZA WATERPROOFING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:
 - 1. Provide a complete 215-mil (5.5mm) thick, reinforced hot rubberized asphalt waterproofing membrane system including all applicable sealants, elastomeric flashings, detailing, reinforcing flashings at corners, joints, penetrations, curbs and drains; separation protection sheet, drainage composite layer, root shield product, moisture retention mat, growing medium, plants and prefabricated green roof drainage.
- B. Related work:
 - 1. Division 3, Section 03300 "Cast-In-Place Concrete."

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300.
- B. Product data:
 - 1. Materials list of items proposed under this Section;
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
 - 3. Submit manufacturer's product data complete with general and specific installation instructions, recommendations and limitations.
 - 4. Shop Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades.
 - 5. Submit material certification(s) signed by manufacturer certifying materials comply with specific performance characteristics and physical requirements. Certification must be evident that all materials are supplied by a single source manufacturer.
 - 6. Manufacturer's current recommended installation procedures which, when reviewed by Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

7. Submit at time of bid, manufacturer's written document that installer is certified as a current Approved Applicator with manufacturer.
8. Submit soil samples and vegetation samples for approval prior to construction. Submittal shall include certification from green roof soil supplier and green roof vegetation supplier that soil medium and vegetation are suitable for use on the project.
9. Submit sample copy of manufacturer's waterproofing warranty identifying the terms and conditions.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- B. Applicator qualifications:
 1. Applicator shall have at least three years experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.
 2. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation. The individual shall have experience with multiple previous installations and competent to respond to concerns raised.
- C. Convene a pre-installation job-site conference three weeks prior to commencing work of this Section:
 1. Secure attendance by Architect, Contractor, applicator, and authorized representatives of the membrane system manufacturer and interfacing trades.
 2. Examine Drawings and Specifications affecting work of this Section, verify all conditions, review installation procedures, and coordinate scheduling with interfacing portions of the Work.
- D. Construct a minimum 10-ft x 10-ft mock-up of waterproofing membrane incorporating all of the components including: concrete deck, primer, hot applied rubberized asphalt, reinforcement fabric, and protection layer. Successful mock-up may remain as part of work.
- E. Maintain copy of manufacturer's installation instructions and MSDS for all products on job-site as well as allow access to the job-site by Owner's Independent Inspector, and Manufacturer Agent.

- F. Owner shall make arrangements and payments for an independent inspection service to monitor installation compliance with the project documents and Manufacturer's published literature, installation instructions, and site specific details. Independent inspection firm shall be a company participating with the Manufacturer's Certified Inspection Program. Inspection service shall produce reports and digital photographs documenting each inspection. Reports shall be made available in a timely manner to the Installer, General Contractor, Manufacturer, Architect and Owner.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in manufacturer's unopened containers with all labels intact and legible at time of use.
- B. Maintain the products in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.
- C. Storage of materials must be in an appropriate location and manner as to protect from any construction damage, as well as damage from weather, prolonged sunlight, excessive temperature and sources of ignition. Remove of any damaged material from job-site and dispose of in accordance with applicable regulations. Do not double stack pallets during shipping or storage. Allow adequate ventilation.
- D. Handling of materials to be in accordance with manufacturers instructions. Melting equipment shall consist of double jacketed, oil bath melter with mechanical agitator. Avoid overheating of hot applied rubberized asphalt.
- E. Comply with pertinent provisions of Section 01600.

1.6 PROJECT CONDITIONS

- A. All federal, state and local regulations, codes, and safety standards must be adhered to at all times.
- B. Do not apply waterproofing system if temperature is less than 0°F (-18°C). Application of hot applied rubberized asphalt shall not be performed during rain, snow or inclement weather; or on frost or wet covered surfaces.

- C. The work area must be adequately ventilated. Warn personnel against breathing of vapors and contact of material with skin and eyes. Limit access to required personnel during the installation process. Do not use flammable products near spark or an open flame. Do not allow the use of spark producing equipment during application and until all vapors have dissipated. Post "NO SMOKING" signs. Wear appropriate protective clothing and respiration protection gear at all times.
- D. Protect adjoining surfaces not to be waterproofed against damage or soiling, including plants, vegetation and animals which may be affected by the waterproofing operations.
- E. Provide adequate protection for membrane after installation. Do not allow any foot or vehicular traffic on unprotected membrane. Do not allow any material or waste products to contaminate membrane. Contact Manufacturer to determine performance impedance, if any, caused by contamination of the membrane.

1.7 SUBSTRATE CONDITIONS

- A. General:
 - 1. Provide applicator with surfaces that are broom clean, dry, sound and free of voids, bugholes, rock pockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing membrane system.
 - 2. Using suitable abrasive methods, remove residue of form release, curing compound, chemical retarders and other surface treatments, laitance, mortar smear, saw cut residue, mill scale, rust, loose material and other contaminants from concrete, masonry and ferrous metal surfaces to receive the work of this Section.
- B. Concrete: Where work of this Section will be applied to concrete, provide surfaces that are smooth with finish equal to one that is light steel trowel followed by a fine hair broom.
- C. Green Roof:
 - 1. Deck surfaces to drains that have flanges at membrane level which are flush with deck surfaces.
 - 2. Rigidly install pipe, vents and other surface protrusions, properly flash them, and cover to prevent entry of membrane materials.

- D. Metal flashings: Where metal flashings are substrate to waterproofing membrane, set the flashings in continuous bedding bead of urethane sealant; install sealant S-bead between metal laps and mechanically fasten to substrate along leading edges at every 4" on center, staggered linearly, to lay flat without fishmouths.
- E. Joints: Configuration shall be consistent with this Section and with all other requirements of the Contract Documents.

1.8 WARRANTY

- A. Deliver to the Owner signed copies of the manufacturer's written warranties validated by Manufacturer confirming acceptance of installation, including independent inspection reports, in accordance with all applicable instructions.
 - 1. Manufacturer's agreed upon warranty.
 - 2. Applicator's standard warranty covering workmanship.
 - 3. Warranty period: 15 years after date of substantial completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Acceptable Manufacturer's:
 - 1. Tremco
 - 2. CETCO
 - 3. Henry Company
- B. All components must be single source from membrane manufacturer to ensure system compatibility.

2.2 PRIMER

- A. Tremco Product:
 - 1. TREMprime QD Low Odor Primer
- B. CETCO Product, (select product(s) per project requirements) :
 - 1. Strataprime WB, water based concrete surface conditioner.
 - 2. Strataprime SB – solvent based concrete surface conditioner.
- C. Henry Product:
 - 1. 930-18 Primer polymer modified primer.

2.3 HOT RUBBERIZED ASPHALT WATERPROOFING MEMBRANES

- A. Tremco Product:
 - 1. Tremproof/Permaquik 6100 HRA a hot rubberized asphalt waterproofing membrane
- B. CETCO Product:
 - 1. Strataseal HR, hot rubberized asphalt waterproofing membrane
- C. Henry Product:
 - 1. 790-11, hot rubberized asphalt waterproofing membranE.

2.4 REINFORCING FABRIC

- A. Tremco Product:
 - 1. Tremco Reemay Spun Bonded Polyester Style 2014, reinforcing fabric
- B. CETCO Product(select product(s) per project requirements) :
 - 1. Stratabond 100 – 1.5-oz non-woven, spunbonded polyester fabric.
 - 2. N-Flash – 60-mil uncured neoprene rubber sheet.
 - 3. FLASH SA – 70-mil self-adhered rubberized asphalt reinforced with a fiberglass mat with a sand surface.
- C. Henry Product:
 - 1. Polyester Fabric reinforcing sheet.

2.5 ROOT BARRIER/PROTECTION BOARD

- A. Tremco Product:
 - 1. Tremco Root-Barrier is installed above the applied Tremproof/Permaquik 6100 HRA waterproofing membrane.
 - 2. Consists of a 40 mil High Density Polyethylene with a double side tape on the outside edge.
 - 3. Overlap the edges by a minimum of 4" (10.2cm)
 - 4. Termination should be consistent with Tremco recommendations
- B. CETCO Product (select product(s) per project requirements):
 - 1. RAP 200 – 90-mil rubberized asphalt protection course reinforced with synthetic fibers with a sand surface.
 - 2. RAP 250FR – 140-mil fire resistant rubberized asphalt protection course reinforced with fiberglass with a granulated surface.
 - 3. RAP 350FR – 160-mil fire resistant rubberized asphalt protection course reinforced with fiberglass with a granulated surface.
 - 4. Root Barrier: Root Barrier 100 a 10-mil thick polyethylene sheet with overlap seams seamed with Volclay Seamtape.

- C. Henry Products, provide one of the following systems:
 - 1. G100s/s w/ Roof Bloc 20 Intensive Root Barrier.
 - 2. DBR 50/100 System.

2.6 FLASHING

- A. CETCO Products (select product(s) per project requirements):
 - 1. N-Flash – 60-mil uncured neoprene rubber sheet. N-FLASH flashing applications require the use of bonding adhesive, splicing cement, and lap sealant.
 - 2. Flash TS – 150-mil torch weld rubberized asphalt reinforced with a fiberglass mat with a sand surface.
 - 3. Flash TG - 160-mil torch weld rubberized asphalt reinforced with a fiberglass mat with a granulated surface.
 - 4. Flash SA – 70-mil self-adhering rubberized asphalt reinforced with a fiberglass mat with a sand surface.
- B. Henry Products (select product(s) per project requirements):
 - 1. NP180s/s Base Sheet flashing not to be exposed.
 - 2. Neoflash Uncured Neoprene Flashing w/ Neoprene Adhesive for expansion joints and exposed flashing.

2.7 DRAINAGE MAT/ WATER RETENTION

- A. Tremco Product:
 - 1. Drainage/Water retention element is three-dimensional, molded panels of recycled material. It should be comprised of a high compressive strength core, an attached top fabric restricting to restrict soil and root growth, bottom fabric to protect membrane, and a perforated, water reservoir core.
 - 2. Under planted areas: TREMDrain GR 1/2"
 - 3. Under paver areas: TREMDrain 1000.
- B. CETCO Product:
 - 1. Under planted areas: Aquadrain 18H turned upside down to create water reservoirs.
 - 2. Under paver areas: Aquadrain 18H.
- C. Henry Product:
 - 1. Under extensive planted areas: Henry DBR 50.
 - 2. Under intensive planted areas: Henry DBR.
 - 3. Under paver areas: Henry DB 650.

2.8 GROWING MEDIUM LAYER

- A. Growing medium depth range for extensive system is 1 1/2" to 6" and for intensive system and is 6" to 24" for intensive system depending on planting design.
- B. Growing material composed of a minimum of 75% mineral soil.
- C. Install growing medium directly onto Roof Drainage. Spread growing medium to proper design thickness throughout the entire Green Roof.
- D. Intensive planting needs to be determined before growing medium layer can be properly designed.

2.9 PLANTING

- A. Refer to Landscape specification for extensive and intensive planting mix.

2.10 PAVERS

- A. Provide pedestals and sand bedding specified elsewhere.
- B. Pavers specified elsewhere.
 - 1. Not permitted with Henry product. Submit alternative.

PART 3 - EXECUTION

3.1 GENERAL

- A. Refer to Manufacturer's Installation Instruction for application of complete membrane system.
- B. The Installer, with the Owner's Independent Inspector, shall examine all surfaces and other conditions under which this section of work is to be performed and notify the contractor in writing of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected and are acceptable for compliance with Manufacturer's warranty requirements. General conditions acceptable for the installation are list below. For conditions not covered in this Section contact the Manufacturer for application guidance.

3.2 ENVIRONMENTAL CONDITIONS

- A. Waterproofing system is not to be applied on wet or frozen substrates.

3.3 SAFETY

- A. Keep waterproofing materials away from open flames or sparks during storage and material application.
- B. HRA should not be heated above 400°F.
- C. Kettle must be operated by workmen thoroughly familiar with its safe operation as recommended by the kettle manufacturer.
- D. Protective clothing, respiratory equipment and eye protection shall be provided and worn by all workmen applying components of HRA system.
- E. Read container labels and Material Safety Data Sheets for health and safety precautions prior to use.

3.4 CONCRETE CONDITIONS

- A. HRA must not be applied over any type of lightweight concrete without prior written approval.
- B. Metal pan decks must be vented as approved by manufacturer.
- C. The structural concrete should have minimum of 4,000 psi compressive strength at 28 days.
- D. The structural concrete should be cured by water or alternately by a dissipating curing compound. Manufacturer shall approve curing compounds in writing prior to bid.
- E. The structural concrete shall have a smooth, light steel trowel finish followed by a fine hair broom or equivalent finish to maintain a minimum coverage rate of 1-3/4 pounds per square foot. A steel float finish will provide too smooth of a surface for proper adhesion of the waterproofing materials, therefore concrete surfaces that have a steel float finish must be mechanically treated prior to the application of the waterproof material.

- F. The concrete surface shall be smooth, free of excessive roughness, voids, protrusions, spalled areas, laitance, honeycombs, float marks or exposed aggregate. Such conditions require more material to achieve an acceptable membrane installation.
- G. The structural concrete deck should be pitched to drains a minimum of 1/8" per foot.
- H. The structural concrete slab shall be cured a minimum of 28 days prior to membrane installation.
- I. Remove all dirt, debris, oil, grease, cement laitance or other foreign matter which will impair the adhesion and performance of the waterproofing membrane.
- J. Any existing membrane residuals shall be rendered to the satisfaction of manufacturer.
- K. Protect adjacent work areas and finished surfaces from damage or contamination during installation operations.
- L. Expansion joints should be sealed with applicable expansion joint material. Detail waterproofing membrane to expansion joint per manufacturer's standard details.

3.5 VERIFYING CONDITIONS

- A. A job site meeting of the general contractor, waterproofing applicator, the owner and manufacturer representative, shall be held to verify all conditions. All prints, drawings, and specifications affecting the work of the section shall be examined. No work shall be undertaken until unacceptable conditions are corrected.
- B. Moisture content of concrete shall be tested immediately before application by the rubber mat test or other approved method.
- C. A test application of the rendered surface condition shall verify that adhesion of the HRA Membrane is acceptable to manufacturer.

3.6 SURFACE CLEANING

- A. All structural concrete surfaces to be waterproofed shall be free of laitance, loose mortar, oil and other contaminants which interfere with proper membrane adhesion.

3.7 PREPARATORY WORK

- A. Apply primer per manufacturer's guidelines to all surfaces to receive hot applied rubberized asphalt membrane. At the changes in plane such as at parapet walls, concrete columns, etc. prime vertical surface to the height specified in the drawings by the architectural engineer. Allow primer to dry prior to installing the membrane. The surface of the concrete will look discolored, but not blackened. Do not allow the primer to pool or become contaminated. Note: Membrane will not adhere properly to wet primer. Install a flashing.
- B. All corner joints shall be treated as recommended by manufacturer.
- C. All shrinkage cracks (less than 1/16 inch) shall be treated as recommended by manufacturer.
- D. All moving structural cracks shall be shall be treated as recommended by manufacturer.
- E. All construction joints and cold joints shall be treated as recommended by manufacturer.
- F. Expansion joints shall be treated as recommended by manufacturer.

3.8 STANDARD MEMBRANE INSTALLATIONS

- A. Preparatory work using must be allowed to fully cure.
- B. HRA Membrane Preparation
 - 1. The membrane is heated in a double jacketed, oil bath type tank with mechanical agitation designed for hot applied rubberized asphalt membrane. Do not use single wall, direct fire equipment to heat rubberized asphalt membrane.
 - 2. Follow manufacturer's instructions for membrane preparations.
- C. Apply base layer of HRA, a continuous monolithic coat, to the surface at a uniform rate sufficient to fully adhere to entire area to be waterproofed. The rate will vary with surface condition; however, a minimum application of 90 mils (.59 lbs per square foot (2.9 Kg/m²)) is required.
- D. Install reinforcing fabric following manufacturer's instructions.

- E. Apply top layer of HRA, a continuous monolithic coat, at the uniform rate of a 125 mils (.83 lbs per square foot (4.05 Kg/m²)) for a total film thickness of 215 mils over entire area to be waterproofed. Allow system to cure for a minimum of 4 hours.
- F. Flood test horizontal area with a minimum 2 inch of water for 48 hours. Plug all drains and provide barriers necessary to contain water. Allow for any overflow to protect the building in the event of rain. Water test must be witnessed, documented and approved by Independent Inspector.
 - 1. Alternative: Electronic testing of deck.
- G. Repair damage, as required, with an application of HRA and reinforcing fabric. Repeat flood test until all leaks are repaired and waterproofing passes test after 48 hours.
- H. Install approved protection board as required upon successful completion of water test.

3.9 ROOT BARRIER PROTECTION

- A. Install root barrier over cured HRA membrane
- B. Overlap the edges a minimum of 4" (10.2cm) and heat weld or tape all seams.
- C. Turn up root barrier at all vertical surfaces and terminate per manufacturer's recommendations to completely protect waterproofing system.

3.10 DRAINAGE/WATER RETENTION

- A. Install approved drainage/water retention mat with open side of the dimple toward the soil under landscaped areas and dimples down under paver areas.
- B. Connect each drainage mat by overlapping the flange

3.11 ROOT BARRIER

- A. Under landscaped areas install root barrier following manufacturer's instructions.

3.12 GROWING MEDIUM

- A. Supply and Install soil mixes to the specified depths.

3.13 PLANTING AND PAVERS

- A. All drains should be fitted with inspection/maintenance boxes accessible at top soil level.
- B. Landscaping to be provided as specified and indicated elsewhere. Monitor Landscape contractor's installation of landscape soil and vegetation over the installed waterproofing assembly to watch for potential damage. Any damage to waterproofing assembly by landscape operations shall be corrected immediately with repair expense covered by Landscape contractor.
- C. Pavers shall be specific brand, type, size, color, thickness, and surface texture as specified elsewhere. Place concrete pavers, where indicated by project design, accurately aligned and leveled with upper surface of pavers in plane with adjacent units. Cut pavers to fit irregularly shaped areas and around protrusions. Install concrete pavers to manufacturer's instructions on approved pedestals or leveling bed per project design.

3.14 JOB COMPLETION

- A. Clean-Up
 1. In areas where adjacent finished surfaces are soiled by work of this Section, consult Manufacturer of surfaces for cleaning advice and conform to their recommendations and instructions.
 2. Remove all debris, tools, equipment and remaining product on-site. Dispose of debris and damaged product following all applicable regulations.
- B. Inspection
 1. The Installer with the Owner's Independent Inspector shall examine all completed work.

END SECTION

SECTION 07170 – BURIED WATERPROOFING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All of the Contract Documents, including General and Supplementary Conditions, and Division 1 General requirements, apply to the work of this section.

1.2 WORK SUMMARY

- A. The work of this section includes, but is not limited to the furnishing and installing the following materials, per project specifications and drawings, or as directed by bentonite waterproofing manufacturer:
 - 1. Bentonite sheet waterproofing membrane.
 - 2. Work includes all applicable sealants, waterstops and waterproofing flashings needed to ensure a complete waterproof system for buried concrete and masonry components at locations indicated.

1.3 RELATED SECTIONS

- A. Other specification Sections which directly relate to the work of this section include, but are not limited to, the following:
 - 1. Division 2: Subsurface and Geotechnical Investigations
 - 2. Division 2: Earthwork, Excavation and Fill, Shoring,
 - 3. Division 2: Geocomposite Foundation Drainage
 - 4. Division 3: Concrete.

1.4 SYSTEM DESCRIPTION

- A. Provide bentonite waterproofing and prefabricated drainage composite system to prevent the passage of liquid water and install without defects, damage or failure. Waterproofing shall be two high strength geotextiles interlocked encapsulating minimum 1.10 lbs. per square foot (5.37 kg/sqm) granular sodium bentonite with an integrated polyethylene liner.

1.5 SUBMITTALS

- A. General: Prepare and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections.

- B. Product Data: Submit manufacturer's product data, with complete general and specific installation instructions, recommendations, and limitations.
- C. Product Samples: Submit representative samples of the selected product for approval:
- D. Material Certificates: Submit certificate(s) signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements. Submit certification that waterproofing system and components, drainage and protection materials are supplied by a single-source manufacturer.
- E. NSF Standard 61 Certification: Submit Official NSF Listing for standard bentonite geotextile waterproofing membrane confirming that product conforms to the requirements of NSF Standard 61 – Drinking Water System Components – Health Effects.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installing company should have at least three (3) years experience in work of the type required by this section, who can comply with manufacturer's warranty requirements, and who is an Approved Applicator as determined by waterproofing/drainage system manufacturer.
- B. Manufacturer Qualifications: Bentonite geotextile waterproofing and all accessory products shall be provided by a single manufacturer with a minimum of 30 years experience in the direct production and sales of bentonite waterproofing systems. Manufacturer shall be capable of providing field service representation during construction, approving an acceptable installer, recommending appropriate installation methods, and conducting a final inspection of the bentonite waterproofing and prefabricated drainage system applied.
- C. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field installation to establish procedures to maintain required working conditions and to coordinate this work with related and adjacent work. Verify that final waterproofing and waterstop details comply with waterproofing manufacturer's current installation requirements and recommendations. Pre-con meeting attendees should include representatives for the owner, architect, inspection firm, general contractor, waterproofing contractor, concrete contractor, excavating/backfill contractor, and mechanical and electrical contractors if work penetrates the waterproofing.

- D. Materials: Obtain bentonite waterproofing with integrated polyethylene liner and prefabricated drainage materials from a single manufacturer to assure material compatibility.
- E. Independent Inspection: Owner shall make all arrangements and payments for an independent inspection service to monitor waterproofing material installation compliance with the project contract documents and manufacturer's published literature and site specific details. Independent Inspection Firm shall be an approved company participating with the waterproofing manufacturer's Certified Inspection Program. Inspection service shall produce reports and digital photographs documenting each inspection. Reports shall be made available to the Contractor, waterproofing installer, waterproofing material manufacturer, and Architect. Inspections should include substrate examination, beginning of waterproofing installation, periodic intervals, and final inspection prior to concrete or backfill placement against the waterproofing.
- F. Water Sample Test: Project site water sample supplied to manufacturer by waterproofing contractor to determine type of bentonite system (standard sodium bentonite or contaminate resistant (CR) sodium bentonite) to be utilized on the project. Manufacturer shall conduct test free of charge. Contractor is responsible for collection and shipment of one liter of actual site water. Water should be shipped in uncontaminated, sealed plastic container to manufacturer for review.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery and Handling: Deliver materials in factory sealed and labeled packaging. Sequence deliveries to avoid delays, while minimizing on-site storage. Handle and store following manufacturer's instructions, recommendations and material safety data sheets. Protect from construction operation related damage and prolonged weather exposure. Remove damaged material from site and dispose of in accordance with applicable regulations.
- B. Storage: Do not double-stack pallets during shipping or storage. During storage protect waterproofing materials from moisture, excessive temperatures and sources of ignition. Provide cover, top and all sides, for materials stored on-site, allowing for adequate ventilation.

1.8 PROJECT CONDITIONS

- A. Substrate Condition: Proceed with work only when substrate construction and preparation work is complete and in condition to receive waterproofing system. Substrates to be free of standing water, dirt and debris, loose material, voids and protrusions or deformations which may inhibit application or performance of waterproofing.
1. Where work of this Section will be installed on earth, provide subgrades that are stable, smoothed and compacted to minimum 95 percent modified proctor density.
 2. Where work of this Section will encounter groundwater, provide waterproofing manufacturer with sufficient groundwater samples taken from Project at logged locations for manufacturers laboratory analysis.
 3. Manufacturer shall provide written report confirming laboratory testing with regard to suitability of waterproofing system for installation in Project conditions.
- B. Weather Conditions: Perform work only when existing and forecasted weather conditions are within the guidelines established by the manufacturer of the waterproofing materials. Do not apply waterproofing materials into standing water or over ice and snow. Though exposure to precipitation and ground water seepage typically will not adversely affect the product, the General Contractor shall maintain site conditions to remove standing water from precipitation or ground water seepage in a timely manner. Should bentonite be subjected to prehydration as a result of prolonged immersion, inspection of the material and written acceptance from manufacturer representative is required prior to concrete or backfill placement.

1.9 WARRANTY

- A. Waterproofing Warranty: Upon completion and acceptance of the work required by this section, the waterproofing materials manufacturer will provide a written one (1) year warranty, covering both materials and labor, to the project owner. Warranty requires the following: (1) System waterproofing products and drainage composite products shall have been provided by a single manufacturer; (2) Installation inspected by certified Independent Inspection Firm per Section 1.06E; (3) In Section 3 work, the manufacturer's waterstop product must be installed in all applicable horizontal and vertical cold pour concrete construction joints and around applicable penetrations. Manufacturer's warranty shall be independent from any other warranties made by the Contractor under requirements of the Contract Documents and may run concurrent with the other warranties.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Provide one of the following systems where indicated on the drawings:
1. CETCO; Voltex DS bentonite interlocked-geotextile waterproofing with integrated polyethylene liner and applicable accessories as manufactured by Colloid Environmental Technologies Company (CETCO), 1500 West Shure Drive, Arlington Heights, Illinois 60004-1440, USA. Phone: (847)392-5800; Fax: (847)506-6195; Web-site: <http://www.cetco.com>.
 2. Tremco; Paramount Paraseal Membranes a complete dual-waterproofing, resealable, composite sheet membrane system composed of high-density polyethylene with a sodium-bentonite face designed for buried concrete or masonry construction having the following attributes.
- B. Obtain primary waterproofing materials of each type required from a single manufacturer to greatest extent possible. Provide accessory materials that are approved by membrane manufacturer.
- C. No substitutions are permitted.
- D. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the membrane system manufacturer as compatible, subject to review of the Architect.

2.2 MATERIALS

- A. Sodium Bentonite: Specially selected Wyoming granular sodium bentonite with 90% passing through a 20-mesh sieve and less than 10% passing through a 200-mesh sieve. Sodium bentonite shall have a 2 gram free swell minimum volume of 16 cc and a maximum fluid loss of 18ml in de-ionized water.
- B. NSF Certified: Standard bentonite geotextile waterproofing membrane with integrated polyethylene liner shall be certified by NSF International to conform to the requirements of NSF Standard 61 – Drinking Water System Components – Health Effects.
- C. Provide base sheet of minimum 6 mil polyethylene sheet for use as hydration barrier below slabs.
- D. VOLTEX BENTONITE GEOTEXTILE WATERPROOFING
 - 1. Volclay Voltex DS[®]: 4' x 14.5' (1.2 x 4.4m) roll of interlocked geotextiles encapsulating a minimum of 1.10 lbs. per square foot (5.37 kg/sqm) of granular sodium bentonite. Composite shall consist of one woven and one non-woven polypropylene geotextile, interlocked using a needle-punching process that produces several interlocks per square inch (6.45 sq. cm) over the entire surface area of product with an integrated polyethylene liner on one side.
 - 2. If soils determine necessary provide Volclay Voltex DSCR[®]: 4' x 14.5' (1.2 x 4.4m) roll of interlocked geotextiles encapsulating a minimum of 1.10 lbs. per square foot (5.37 kg/sqm) of contaminant resistant granular sodium bentonite. Composite shall consist of one woven and one non-woven polypropylene geotextile, interlocked using a needle-punching process that produces several interlocks per square inch (6.45 sq. cm) over the entire surface area of product with an integrated polyethylene liner on one side.
- E. TREMCO BENTONITE WATERPROOFING
 - 1. For applications in areas where saline, alkaline, acid or otherwise contaminated groundwater conditions exist, provide "Paramount Saltwater Paraseal," which is Paraseal Membrane specially designed.
- F. CETCO ACCESSORY WATERPROOFING PRODUCTS: All accessory waterproofing materials shall be provided by the bentonite waterproofing manufacturer or shall have manufacturer's written approval for substitution.
 - 1. Volclay Bentoseal[®]: Trowel grade sodium bentonite compound used as a detailing mastic around penetrations, corner transitions and grade terminations.

2. Volclay Hydrobar Tubes: 2" (50 mm) diameter x 2' (60 cm) long, water soluble tube container filled with granular sodium bentonite
3. Volclay Waterstoppage®: 50 lbs. (22.7 kg) bag of granular Volclay sodium bentonite.
4. Volclay SeamTape®: 2" (50 mm) wide butyl rubber sealant tape.
5. Termination Bar: Min. 1" (25 mm) wide aluminum bar with pre-punched holes on 12" (300 mm) centering for fastening.
6. Volclay TB-Boot®: performed EPDM tie-back cover or field fabricated 26 gauge galvanized sheet metal tie-back covers.

G. TREMCO ACCESSORY WATERPROOFING PRODUCTS: All accessory waterproofing materials shall be provided by the bentonite waterproofing manufacturer or shall have manufacturer's written approval for substitution.

1. For installation at horizontal-to-vertical junctures, provide "Paramount Paragranular" loose bentonite granules in weatherproof 50 lb. bags and capable of swelling to occupy a minimum volume of 17 ml when 2 grams are dispersed into deionized water.
2. For detailing vertical junctures and penetrations, provide "Paramount Paramastic" non-hydrated expandable mastic of trowelable consistency containing not less than 55 percent high swelling Wyoming sodium bentonite.
3. Provide the following fasteners as needed:
 - a. Case-hardened steel nail with fluted shank having a minimum 1" length and a minimum 1" diameter cap for use on green concrete and masonry substrates.
 - b. Powder shot steel pin having a minimum 3/4" diameter washer for use on hardened concrete and grouted masonry substrates.
 - c. Steel staples approved by membrane manufacturer for use according to Project conditions.
4. "Paramount Permanent Seam Tape" reinforced, rubberized-asphaltic waterproofing seam tape 4" wide by 60 mils thick for sealing membrane overlaps wherever flood-testing is required and elsewhere as required by Project conditions or designs.
5. "Paramount Para JT Tape" non-reinforced, adhesive tape of partially cross-linked polymeric elastomers 2" wide by 1/8" thick for molding form-fit seals around difficult contours and for taping seams within overlaps.
6. Provide "Paramount Paraterm Bar" extruded aluminum bar with upper flange to receive sealant for terminations at grade line and on parapet walls.
7. Provide "Vulkem 116 Sealant" one-part or Vulkem 227 two-part, gun-grade polyurethane sealant for completing termination seals and other sealing recommended by manufacturer.

8. Provide "Vulkem 201 or Vulkem 222 Elastomeric Flashing" polyurethane, liquid-applied, elastomeric waterproofing flashing.
9. Provide "Paramount Parastick'N'Dry" pressure sensitive, double-sided tape laminate of bentonite sandwiched between a netting and non-woven fabric for wrapping through-concrete imbeds and other detailing.
10. Provide "Paramount Superstop" flexible, reinforced, bentonite-laminate waterstop strips 1/2" by 1" by 20' -0" with pressure-sensitive adhesive backing for sealing static cold joints in concrete.
11. Provide "Paramount Paraprimer" versatile adhesive bonding agent primer formulated for use with tapes and pressure-sensitive waterproofing accessories.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with contract documents and manufacturer's product data, including product application and installation instructions.

3.1 SUBSTRATE INSPECTION AND CONDITIONS

- A. The installer, with the Owner's Independent Inspector present, shall examine conditions of substrates and other conditions under which this section work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected and are acceptable for compliance with manufacturer's warranty requirements. General substrate conditions acceptable for the waterproofing installation are listed below. For conditions not covered in this Section, contact the waterproofing manufacturer for guidance.
- B. SOIL SUBSTRATES: Site conditions allowing, standard bentonite sheet applications do not require a mud-working slab. Grade substrates should consist of well-leveled soils without voids and debris, and compacted to a minimum of 85% Modified Proctor density. If substrate consists of large aggregate, place a high-strength geotextile layer over the aggregate and then provide several inches of compacted soil or sand for uniform support and containment of waterproofing sheets.

- C. CONCRETE: Reinforced structural slabs should be a minimum of 6" (150 mm) thick when placed on a working mud slab. Reinforced concrete slab(s) on compacted grade shall be a minimum of 4" (100 mm) thick. Install bentonite sheets under all elevator pits. Cast-in-place concrete to receive waterproofing shall be of sound structural grade with a smooth finish, free of debris, oil, grease, laitance, dirt, dust, or other foreign matter which will impair the performance of the waterproofing and drainage system and which do not comply with manufacturer's warranty requirements. Bentonite sheet can be installed on green structural concrete as soon as the forms are removed. There is no product limitation regarding a minimum concrete curing time requirement for bentonite sheet to be installed over structural concrete. Do not apply bentonite sheet waterproofing over lightweight insulating concrete.
1. Form fins, ridges, and other protrusions should be level and smooth with monolithic concrete surface. Honeycombing, aggregate pockets, tie-rod holes and other voids should be completely filled with non-shrink cementitious grout and level with monolithic concrete surface.
 2. Related work to be completed under Division 3. waterstop shall be installed in all applicable vertical and horizontal concrete construction cold pour joints and around applicable penetrations and structural members. Refer to waterstop product manual for further installation procedures and guidelines.

3.2 SURFACE PREPARATION

- A. Remove dirt, debris, oil, grease, cement laitance, or other foreign matter which will impair or negatively affect the performance of the waterproofing and drainage system.
- B. Protect adjacent work areas and finish surfaces from damage or contamination from waterproofing products during installation operations.

3.3 GENERAL INSTALLATION GUIDELINES

- A. Install bentonite sheet with the woven geotextile side facing the concrete (polyethylene liner side away from concrete) to be waterproofed in both horizontal and vertical applications. Overlap bentonite sheet edges a minimum 4" (100 mm) or greater as defined herein.

3.4 UNDER SLAB INSTALLATION

- A. Reinforced structural foundation slabs should be a minimum of 6" (150 mm) thick when placed on a working mud slab. Reinforced concrete slab(s) on compacted grade shall be a minimum of 4" (100 mm) thick. Install bentonite sheet under all elevator pits.
- B. Install underslab bentonite sheet membrane extending to base of shoring wall (poly side down; woven geotextile side up) fully overlapping the 12" (300 mm) horizontal tail of the bentonite sheet corner transition sheet. Secure corner edge of membrane with washer-head fasteners or pneumatic staples 12" (300 mm) on center.
- C. Place bentonite sheet directly on properly prepared substrate (poly side down; woven geotextile side up facing installer) with adjoining edges overlapped a minimum of 4" (100 mm). Stagger sheet end seams a minimum of 24" (60 cm). Mechanically fasten or staple bentonite sheet as required to prevent movement from construction operations or concrete placement. When the slab is poured in sections, extend bentonite sheet a minimum 12" (300 mm) beyond the slab edge to enable proper overlapping.
- D. Detail all slab penetrations, grade beams, and pile caps, install 1/4" (6 mm) thick layer of waterstoppage extending a 6" (150 mm) radius. Cut bentonite sheet to fit snugly around penetrations and pile caps. Around base of penetrations trowel 3/4" (18 mm) thick fillet of seal and extend the seal up the penetration 1-1/2" (38 mm) and onto the bentonite sheet. Around base of pile caps and grade beams trowel 3/4" (18 mm) thick fillet of seal and extend the seal up the cap and onto bentonite sheet a minimum 2" (50 mm).
- E. Inspect finished bentonite sheet installation and repair any damaged material prior to concrete slab placement.
- F. Related work to be completed under Division 3. Waterstop shall be installed in all slab joints, around applicable slab penetrations and structural members. Refer to waterstop product manual for further installation procedures and guidelines.

3.5 SLAB / FOOTING EDGE TRANSITION COURSE

- A. Provide a minimum of 6" (150 mm) overlap between underslab and vertical wall waterproofing. Secure overlap with washer-head fasteners a minimum of 24" (600 mm) on center and apply seal to the overlap edge.
- B. At the slab/footing form edge, secure bentonite sheet horizontally oriented (poly side down; woven geotextile facing installer) to the top inside edge of the exterior slab/footing form with the sheet conforming to the interior form sides and then extending out onto the horizontal slab substrate a minimum 12" (300 mm). Overlap edges of adjacent bentonite sheet a minimum 4" (100 mm) and secure to prevent sheet movement during construction or concrete placement.

3.6 BACKFILLED CAST-IN-PLACE CONCRETE WALLS

- A. Place transition bar along the wall/footing intersection with ends "butted" tightly together to form a continuous installation.
- B. Trowel 3/4" (18 mm) thick, continuous seal fillet at all inside wall corner transitions. Trowel seal form-tie pockets/patches and any slightly irregular honeycomb areas.
- C. Starting at the base of the wall, install bentonite sheet horizontally (woven geotextile against the wall; poly side facing installer) covering the transition bar and extending onto the footing a minimum of 6" (150 mm). For hydrostatic conditions, cover the entire footing and overlap waterproofing membrane from underslab work a minimum of 6" (150 mm). Attach bentonite sheet using washer-headed mechanical fasteners centered 24" (60 cm) around the sheet edge. Overlap all adjacent sheet edges a minimum 4" (100 mm). Stagger all vertical overlap seams a minimum of 12" (300 mm).
- D. After the bottom horizontal course, bentonite sheet can be installed either vertically or horizontally oriented. Continue bentonite sheet installation up wall to finished grade elevation, staggering all sheet roll ends of adjacent courses a minimum 12" (300 mm). Do not allow horizontal bentonite sheet overlap joints to run at same elevation as the concrete pour lift joints. Overlap all adjacent bentonite sheet edges a minimum 4" (100 mm).

- E. Cut bentonite sheet to fit snugly around penetrations. Detail around all penetrations with 3/4" (18 mm) cant of seal. Completely fill any space between the penetration and bentonite sheet edge. Extend seal 1/4" (6 mm) thick over substrate a minimum radius of 1-1/2" (38 mm) and onto penetration.
- F. Where applicable terminate bentonite sheet at grade with metal termination bar fastened 12" (300 mm) on center. Cover top edge of bentonite sheet with 1/2" (12 mm) thick, 2" (50 mm) wide layer of seal.
- G. Inspect finished bentonite sheet installation and repair any damaged material prior to backfill placement. Assure that bentonite sheet is not displaced during backfill placement or soil compaction.

3.7 CLEAN UP

- A. Clean areas where adjacent finished surfaces are soiled by work of this Section. Remove all tools, equipment and remaining product on-site. Dispose of section work debris and damaged product following all applicable regulations.

END OF SECTION 07170

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Extruded polystyrene board.
 - 2. Glass fiber blanket/batt.
 - 3. Blown in Dens-Pak Cellulose Insulation.
- B. Related Sections:
 - 1. Gypsum drywall assemblies: Division 9.
 - 2. Mechanical system insulation: Division 15.
 - 3. Insulation in headers: Division 6.

1.3 REFERENCES

- A. ASTM C 578-92 -- Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 1992.
- B. ASTM C-739 -- Standard Specification for Loose Fill Insulation.
- C. ASTM C-518 -- Standard Specification for Thermal Resistance.
- D. ASTM E-970 -- Standard Specification for Critical Radiant Flux.
- E. ASTM E-84 -- Standard Specification for Flame Spread.
- F. ASTM E 136-93a -- Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degree C; 1993.
- G. ASTM E-119.

1.4 DEFINITIONS

- A. Thermal Resistance (R-value): The temperature difference in degrees F between the two surfaces of a material of given thickness, required to make 1 Btu of energy flow through 1 square foot of the material in 1 hour.

1.5 SUBMITTALS

- A. Product Data: Submit for each product specified in this section.
- B. Manufacturer's Instructions: Obtain and submit manufacturer's instructions for installation of products in specific applications indicated for this project. If preprinted instructions do not clearly establish installation procedures applicable to project conditions, submit manufacturer's instructions prepared specifically for this project.
 - 1. Include instructions for examination, preparation, and protection of adjacent work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Foamed Plastic Insulation: Minimize period between product delivery and actual installation. Protect against exposure to flame, sparks, or excessive heat. Minimize exposure to sunlight.

1.7 QUALIFICATIONS

- A. Dens-Pak cellulose blown-in installation should be made only by factory-certified contractors using approved equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide manufacturer's standard preformed insulation units, sized for proper fit in indicated applications.
- B. Extruded Polystyrene Board Insulation: Manufactured by extrusion process with integral high density skin:
 - 1. Type X (ASTM C 578): 15.0 psi compressive strength.
 - 2. Total R-value or thickness: Indicated on drawings.
 - 3. Manufacturers: Provide products complying with requirements of the contract documents and made by one of the following:
 - a. Dow U.S.A.
- C. Glass Fiber Insulation-Blanket/Batt:
 - 1. Unfaced blanket/batt: Type I (ASTM C 665), passing ASTM E 136 combustion test requirements.
 - 2. Total R-value or thickness: Indicated on drawings.

3. Provide products complying with requirements of the contract documents and made by one of the following:
 - a. CertainTeed Corporation.
 - b. Manville Roofing Systems, a Division of Schuller International, Inc.
 - c. Owens-Corning Fiberglas Corporation.

- D. Cellulose Dens-Pak Insulation:
 1. Manufacturer: Nu-Wool Company, Inc.
 2. Nu-Wool Cellulose Insulation, Wall seal for walls.
 3. Total R-value: Indicated on drawings.
 4. Provide thickness as indicated by manufacturer to achieve R-value. Where R-Value is not indicated fill cavity fully.

- E. Open Cell Spray Foam:
 1. Manufacturer: Demilec, Inc.
 2. Product: Selection 500.
 3. Total R-value: Indicated on drawings.
 4. Provide thickness as indicated by manufacturer to achieve R-value. Where R-Value is not indicated fill cavity fully.

- F. Spray applied cellulose sound control material:
 1. Manufacturer and product:
 - a. International Cellulose Corporation; K-13 Spray-On System.
 2. Thickness: 1" .
 3. Color; Not critical, lowest cost option.

- G. Fire Safing:
 1. Thermafiber Safing Insulation mineral wool type insulation.
 - a. UL and OPL labeled product.
 - b. Comply ASTM C 665 and ASTM C 612-00.

- H. Vapor Retarder: Not required.

- I. Vent Chute:
 1. Provide the following product or equal product as determined by Architect:
 - a. "Polyvent"; Plastifoam, Rockville, CT.

2.2 ACCESSORIES

- A. Provide accessories as necessary to properly install specified products.
 - 1. Adhesive: Insulation manufacturer's recommended adhesive, complying with fire performance requirements.
 - 2. Staples.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that conditions conform to requirements of contract documents.
- B. Verify that related work to be performed within indicated spaces before installation of insulation has been completed.
- C. Verify that substrates are in satisfactory condition to receive insulation.
- D. Do not proceed until unsatisfactory conditions have been corrected. Commencement of installation indicates acceptance of conditions.

3.2 PREPARATION

- A. Clean substrates of any substances which might damage materials to be installed.
- B. Remove harmful projections capable of puncturing vapor retarder.

3.3 INSTALLATION

- A. Do not install insulation which is damaged, wet, soiled, or which has been covered at any time with ice or snow.
- B. Comply with insulation manufacturer's recommendations and installation sequence. Provide permanent placement and support of insulation.
- C. Install materials in a manner which will maximize continuity of thermal envelope. Use a single layer of insulation wherever possible to achieve indicated requirements, unless otherwise indicated.
- D. Insulation Boards:
 - 1. Cut insulation neatly as required to fit tightly around obstructions.
 - 2. Install boards as indicated. Butt board edges and ends tightly. Form solid joints where insulation boards meet protrusions and between adjacent boards. Stagger joints.

3. Foamed plastic insulation: Coordinate installation as necessary with work specified elsewhere to ensure that insulation is concealed promptly after installation.
 4. Extruded polystyrene insulation:
 - a. Foundation installation: Provide installation capable of sustaining subsequent construction work without damage or displacement.
 - (1) Adhesive: Use insulation manufacturer's recommended adhesive to attach insulation boards to foundation. Maximize contact between board surface and substrate.
- E. Insulation Blankets/Batts:
1. Install properly sized blankets/batts conforming to indicated spacings of framing members.
 2. Cut insulation neatly as required to fit tightly around obstructions.
 3. Application: Wood-framed construction:
 - a. Unfaced insulation: Friction-fit insulation between framing members.
- F. Dens-Pak Cellulose Insulation:
1. Cellulose insulation: Blow insulation using pneumatic equipment, into indicated spaces or areas after all mechanical, plumbing and electrical and other utility installations have been completed. Provide insulation manufacturer's recommended density to achieve total R-value required.
 - a. Horizontal installation: Level loose insulation to consistent thickness. Insulation may be allowed to settle slightly to provide homogeneous density. Excessive compaction is not acceptable.
 - b. Vertical installation: Install following manufacturer's instructions. Nu-Wool WALLSEAL insulation is pneumatically sprayed with a controlled water fog for adhesion into open wall cavities. Drywall may be installed 24 hours after application. Total drying time is approximately 30 days.
 - c. Installation procedures and techniques are as recommended by manufacturer using machines approved for blown in insulation.
- G. Open Cell Spray Foam Insulation:
1. Install strictly following manufacturer's instructions.
- H. Spray Applied Cellulose Insulation:
1. Install strictly following manufacturer's instructions.

3.4 PROTECTION

- A. Protect installed materials from damage until permanent concealing work is completed.
- B. Where concealing work is not performed immediately after installation work of this section is completed, erect suitable temporary coverings or enclosures to prevent damage.

END OF SECTION 07210

SECTION 07410 – METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
- B. Standing-seam metal roof panels.
- C. Related Sections include the following:
 - 1. Division 5 Section "Cold-Formed Metal Framing" for metal framing.
 - 2. Division 6 Section "Rough Carpentry" for wood framing and sheathing.
 - 3. Division 7 Section "Sheet Metal Flashing and Trim" for flashing not part of roofing and other sheet metal work.
 - 4. Division 7 Section "Joint Sealants" for field-applied sealants.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide manufactured wall panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.
- B. Air Infiltration: Provide manufactured wall panel assemblies with permanent resistance to air leakage through assembly of not more than 0.09 cfm/sq. ft. of fixed wall area when tested according to ASTM E 1680 at a static-air-pressure difference of 4.0 lbf/sq. ft..
- C. Water Penetration: Provide manufactured wall panel assemblies with no water penetration as defined in the test method when tested according to ASTM E 1646 at a minimum differential pressure of 20 percent of inward acting, wind-load design pressure of not less than 6.24 lb/sq. ft. and not more than 12.0 lb/sq. ft..
- D. Wind-Uplift Resistance: Provide wall panel assemblies that meet requirements of UL 580 for Class 90 wind-uplift resistance.

- E. Structural Performance: Provide manufactured wall panel assemblies capable of safely supporting design loads indicated under in-service conditions with vertical deflection no greater than the following, based on testing manufacturer's standard units according to ASTM E 1592 by a qualified independent testing and inspecting agency.
 - 1. Maximum Deflection: 1/140 of the span.

1.4 SUBMITTALS

- A. Product Data: Include manufacturer's product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.
- B. Shop Drawings: Show layouts of panels on walls, details of edge conditions, joints, panel profiles, supports, anchorages, trim, flashings, underlayment, closures, snow guards, and special details. Distinguish between factory- and field-assembled work.
- C. Samples for Initial Selection: Manufacturer's color charts or chips showing the full range of colors, textures, and patterns available for wall panels with factory-applied finishes.
- D. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Product Test Reports: Indicate compliance of manufactured wall panel assemblies and materials with performance and other requirements based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer who has completed metal wall panel projects similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver panels and other components so they will not be damaged or deformed. Package panels for protection against damage during transportation or handling.

- B. Handling: Exercise care in unloading, storing, and erecting wall panels to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight and ventilated covering. Store panels to ensure dryness. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify location of structural members and openings in substrates by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, either establish opening dimensions and proceed with fabricating wall panels without field measurements or allow for trimming panel units. Coordinate wall construction to ensure actual locations of structural members and to ensure opening dimensions correspond to established dimensions.

1.8 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish on metal wall panels within the specified warranty period and agreeing to repair finish or replace wall panels that show evidence of finish deterioration. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.
- C. Finish Warranty Period: 20 years from date of Substantial Completion.
- D. Special Weathertight Warranty: Submit a written warranty executed by manufacturer agreeing to repair or replace metal wall panel assembly that fails to remain weathertight within the specified warranty period.
- E. Weathertight Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: The manufacturer offering metal panels to be incorporated into the Work is the following:
 - 1. Metal Standing Seam Panels:
 - a. Petersen Aluminum Corp., PAC-CLAD.
 - 2. Other manufacturers substitutions will be considered when its equality to specified product when submitted following procedure in General Requirements.

2.2 METALS AND FINISHES

- A. Standing Seam Roof System: ASTM E 1592, cold-rolled sheet.
- B. Finishes: Kynar 500, Refer to color scheme for selected colors.

2.3 ROOF PANEL ASSEMBLIES

- A. Standing-Seam Wall Panels: Manufacturer's standard factory-formed, standing-seam wall panel assembly designed for concealed mechanical attachment of panels to roof sheathing. Provide one of the following products:
 - 1. PAC-CLAD; Redi-Roof Panel, 18", 1 3/8" stiffener beads, .032 aluminum.
 - 2. Color to be selected from manufacturer's standard colors during the submittal process.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and accessories required for a complete roof panel assembly and as recommended by panel manufacturer, unless otherwise indicated.
- B. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
 - 1. Clips: Provide panel clips designed to meet negative-load requirements.
 - 2. If required provide exposed fasteners with heads matching color of panel by means of plastic caps or factory-applied coating.
 - 3. Provide metal-backed neoprene washers under heads of exposed fasteners bearing on weather side of panels.

4. Locate and space exposed fasteners in true vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of neoprene washer.
- C. Accessories: Unless otherwise specified, provide components required for a complete roof panel assembly including flashings, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.
1. All factory or field fabricated pieces to be .032 Aluminum.
 2. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
 3. Elastomeric Joint Sealant: ASTM C 920, of base polymer, type, grade, class, and use classifications required to seal joints in panel wall and remain weathertight. Provide sealant recommended by panel manufacturer.
- D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat, unless otherwise indicated. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- E. Underlayment: WR Grace; Vycor Ultra.

2.5 FABRICATION

- A. General: Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements indicated for conditions affecting performance of metal panel.
1. Panel Supports and Anchorage: Examine framing to verify that purlins, angles, channels, and other secondary structural panel support members and anchorage have been installed according to written instructions of panel manufacturer.
 2. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate metal panel with rain drainage work; flashing; trim; and construction of decks, parapets, walls, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.
- B. Promptly remove protective film, if any, from exposed surfaces of metal panels. Strip with care to avoid damage to finish.

3.3 PANEL INSTALLATION

- A. General: Comply with panel manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Field cutting exterior panels by torch is not permitted.
 - 2. Install panels with concealed fasteners, unless otherwise indicated.
 - 3. Install panels over solid substrate with minimum 3:12 slope. Install 1 ply of felt from lower edge up, with at least 3-inch side laps and 4-inch end laps.
- B. Accessories: Install components required for a complete wall panel assembly including trim, copings, fasciae, ridge closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items.
 - 1. Install accessories with concealed fasteners, unless otherwise indicated.
- C. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized-asphalt underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.
- D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not otherwise indicated, types recommended by panel manufacturer.
 - 1. Install weatherseal under ridge cap. Flash and seal panels at eave and rake with rubber, neoprene, or other closures to exclude weather.
 - 2. Seal panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by panel manufacturer.

3. Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."

- E. Standing-Seam Panel Assembly: Fasten panels to supports with concealed clip according to panel manufacturer's written instructions.
 - 1. Install clips at each support with self-drilling/self-tapping fasteners.
 - 2. At end laps of panels, install tape calk between panels.
 - 3. Install factory-calked cleats at standing-seam joints. Apply snap-on batten to panels to provide a weathertight joint.
- F. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.4 CLEANING AND PROTECTING

- A. Damaged Units: Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- B. Cleaning: Remove temporary protective coverings and strippable films, if any, as soon as each panel is installed. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

END OF SECTION 07410

SECTION 07460 – FIBER CEMENT BOARD SIDING & TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fiber Cement Board clapboard siding.
 - 2. Fiber Cement Board trim.
 - 3. Air Infiltration Barrier
- B. Coordinate this section with interfacing and adjoining work for proper sequence of installation
- C. Related Sections
 - 1. Section 06100 – Rough Carpentry
 - 2. Section 07900 – Sealants
 - 3. Section 09900 – Paint

1.3 SUBMITTALS

- A. Submit three 6 inch x 6 inch pieces of fiber-cement claddings in texture and widths shown and specified herein.
- B. Submit specifications, installation data and product data.

1.4 PRODUCT HANDLING

- A. Stack fiber-cement claddings on edge or lay flat on a smooth, level surface. Protect edges and corners from chipping. Store sheet under cover and keep dry prior to installing.

1.5 PROJECT CONDITIONS

- A. Substrates:
 - 1. Do not apply trim over wet or moist substrates.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A company with installation experience of units the same or similar to those included in this section, and authorized or licensed by manufacturer.

1.7 WARRANTY

A. Special Project Warranty: Submit a written warranty signed by the manufacturer and installer, guaranteeing to correct failures in product and workmanship which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents. Failure shall be defined as any interruption of watertight condition.

1. Warranty period: 2 years; starting from the date of substantial completion.

B. Manufacturer's Product Warranty: Submit manufacturer's standard written warranty signed by the manufacturer, guaranteeing to replace siding materials which have failed in performance.

1. Warranty period: 50 years; starting from the date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Fiber cement siding and trim to be manufactured by one of the following provided they are in compliance with the drawings:

1. James Hardie Siding Products
2. Cemplank. Inc.

2.2 MATERIAL

A. Non-asbestos fiber-cement siding to comply with ASTM Standard Specification C1186 Grade II, Type A.

B. Siding

1. Shall meet the International Building Code. Non asbestos fiber-cement siding to be non-combustible when tested in accordance with ASTM test method E136.
2. Clapboards: James Hardie Siding Products; Hardiplank Lap Siding, Smooth, 4" Exposure.

3. Vertical Siding: James Hardie Siding Products; Hardie Panel Vertical Siding, Smooth, 4'x8' and 4'x10'.

C. Trim:

1. Refer to the drawings for the sizes and types of trim.
2. 5/4 Trim: HardiTrim XLD Technology, Smooth.
3. 1x Trim: HardiTrim HLD, Smooth.
4. HardieTrim Planks or 7/16"x2 1/2" HardiTrim for vertical siding battens.
5. Soffits: HardiSoffit, Non-vented, Smooth.
6. Top floor deck ceiling: Beaded Porch Panel. Primed and field painted with two coats.

D. Finish:

1. Provide ColorPlus Technology System.
2. Field apply final coat of paint under section 09900.
3. Colors to be selected from manufacturer's standard colors during the submittal process.

E. Exterior Brackets:

1. Fypon, BKT10X12X4.
2. install with long dimension horizontal.
3. Provide adhesive as recommended by manufacturer.

F. Exterior Window Crowns:

1. AZEK, Ram Crown, AZM-6934.
2. Provide adhesive as recommended by manufacturer or blind nail on top.
3. Paint to match casing behind using paint as recommended by manufacturer.

G. Vinyl Privacy Lattice:

1. Genova Products; Choice Lattice, Privacy w/ U-Channels & H-Channels.
2. Permalatt Products, Inc; Vinyl Lattice, 1" Diagonal w/ U-Channels & H-Channels.
3. Color to be selected from standard colors during construction.
4. Provide accessories for a complete installation.

H. Accessories:

1. Provide all manufacturer's matching accessories, such as nails, caulk and patching material for holes.

2.3 FASTENERS

A. Nails: As recommended by the manufacturer.

2.4 AIR INFILTRATION BARRIER

A. Tyvek Commercial Wrap air infiltration barrier. No substitutes.

1. Maximum roll widths available.

2.5 DRYER VENT WALL CAP

A. Mid-America; Master Exhaust Vent, Square Trim Ring.

1. Color to be selected from manufacturer's standard colors during the submittal process.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Correct conditions detrimental to timely and proper completion of work.

3.2 INSTALLATION – AIR INFILTRATION BARRIER

A. Install underlayment strictly adhering to the manufacturer's installation instructions and following the details on the drawings. Install after window installation. Install underlayment where shown on the drawings.

B. Install weatherboard fashion; lap horizontal joints 4 inches, minimum; lap vertical joints 6 inches, minimum. Tape all joints.

3.3 INSTALLATION – SIDING

A. Install siding and trim strictly following the manufacturer's installation instructions. Install siding with maximum lengths possible for wall surface area to be covered. Short lengths with a joint in short sections of the walls, such as between windows, shall not be acceptable.

B. All cut ends to be located against a trim or casing piece.

C. If a pneumatic nailing device is to be used a Hitachi adjustable nailing device shall be used. The cutting device for all siding and trim shall be a sliding chop saw type in order to provide a proper cut edge.

3.4 INSTALLATION – TRIM

- A. Install flashing around all wall openings.
- B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
- C. Place fasteners no closer than 1 inch from end. Fasten maximum 16 inch on center.
- D. Maintain clearance between trim and adjacent finished grade.
- E. Trim inside corner with single board.
- F. Install single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten fiber-cement board to fiber-cement board.
- G. Seal gaps with high quality, paintable caulk.
- H. Shim frieze board and window/door casing as required to align with adjacent trim.
- I. Install fiber cement fascia over structural sub fascia.
- J. Provide patching material for nail holes in trim.

3.5 FINISHING

- A. Caulk all joints against trim edges.
- B. Field apply final coat of paint after installation and caulking is complete.
- C. Protect siding from other trades.

3.6 CLEANING

- A. Remove scraps and debris from the site on a regular and frequent basis. Do not allow to accumulate.

END OF SECTION 07460

SECTION 07531 - MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Membrane roofing and roofing accessories.

1.3 RELATED SECTIONS

- A. Section 07600 – Flashing and Sheet Metal.
- B. Division 15000 - Plumbing Specialties: Roof drains and vents.
- C. Division 15000: Prefabricated curb for mechanical equipment.

1.4 REFERENCES

- A. ANSI/ASTM D412 - Rubber Properties in Tension.
- B. ANSI/ASTM D746 - Brittleness Temperature of Plastics and Elastomeric by Impact.
- C. ASTM D624 - Rubber Property - Tear Resistance.
- D. ASTM D822 - Practice for Operating Light and Water-Exposure Apparatus (Carbon-Arc) Type for Testing Paint, Varnish, Lacquer, and Related Products.
- E. ASTM D1004 - Initial Tear Resistance of Plastic Film and Sheeting.
- F. ASTM D2240 - Rubber Property - Durometer Hardness.
- G. ASTM C272 - Water Vapor Transmission of Materials.
- H. Factory Mutual Engineering & Research Corporation (FM) - Roof Assembly Classifications.
- I. National Roofing Contractors Association (NRCA) - Roofing and Waterproofing Manual.

- J. Underwriters Laboratories (UL) - Fire Hazard Classifications.
- K. ASTM D4667 - Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane

1.5 SYSTEM DESCRIPTION

- A. Elastomeric Sheet Membrane Conventional Roofing System: Single ply membrane system with recovery board and flashing.

1.6 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate fascia, flashing, intersection of new and existing joint and termination detail conditions, conditions of interface with other materials. Includes details for new equipment flashing conditions.
- C. Determine roof uplift pressure in accordance with current FM LPDA 1-28. Submit determination calculation sheet with submittal for approval.
- D. Product Data: Provide characteristics on membrane materials, flashing materials, insulation, recovery board, vapor retarders and walkway.
- E. Manufacturer's Installation Instructions: Indicate special precautions required for seaming the membrane.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with three years documented experience.
- B. Applicator: Company specializing in performing the work of this section with 3 years experience and approved by system manufacturer.
- C. Work of this section to conform to NRCA Roofing and Waterproofing Manual manufacturer's instructions.

1.8 REGULATORY REQUIREMENTS

- A. Conform to applicable local current building code for roof assembly fire hazard requirements.
- B. Underwriters Laboratories, Inc. (UL): Class A Fire Hazard Classification.

- C. Factory Mutual Engineering & Research Corporation (FM): Roof Assembly Classification wind uplift requirements in accordance with FM LPDS 1-28.

1.9 PRE-INSTALLATION CONFERENCE

- A. Convene one week prior to commencing work of this section, under provisions of General Conditions.
- B. Review installation procedures and coordination required with related Work.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of General Conditions.
- B. Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.
- C. Store products in weather protected environment, clear of ground and moisture.

1.11 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply roofing membrane during inclement weather ambient temperatures below 45 degrees F or above 90 degrees F.
- B. Do not apply roofing membrane to damp or frozen deck surface.
- C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.12 COORDINATION

- A. Coordinate the work with the installation of associated metal flashings, as the work of this section proceeds.

1.13 WARRANTY

- A. Provide 15 year warranty under provisions of General Conditions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - MEMBRANE MATERIAL

- A. All materials of the roofing system shall be manufactured by one manufacturer source.
- B. Membrane Roofing system manufactured by one of the following manufacturers:
 - 1. Firestone Building Products Co.
 - 2. Carlisle Syntec Incorporated
 - 3. Versico Inc.
- C. Other equal systems by other manufacturers may be submitted for approval. PVC roofing shall not be considered as an equal.

2.2 MEMBRANE AND ASSOCIATED MATERIALS

- A. White Membrane, provide one of the following:
 - 1. Color: White
 - 2. Firestone: UltraPly
 - 3. Carlisle: Sure-White.
 - 4. Carlisle: Sure-Weld.
 - 5. Versico: VersiWeld.
- B. Seaming Materials: Provide what is recommended by manufacturer.

2.3 ADHESIVE MATERIALS

- A. Surface Conditioner: As recommended by membrane manufacturer.
- B. Membrane Adhesives: As recommended by membrane manufacturer.
- C. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

2.4 RECOVERY BOARD

- A. Recovery Board:
 - 1. Firestone: ½" FiberTop "E"
 - 2. Carlisle; 1/2" HP Recovery Board.
 - 3. Versico: 1/2" panel as approved by manufacturer.

2.5 INSULATION

- A. Insulation: Closed cell polyisocyanurate foam with the following characteristics:

Board Density:	Nominal 2 lb/cu ft
Board Size:	48 x 96 inch
Board Thickness:	8 inches
Thermal Resistance:	R5.56/inch as determined by ASTM C158.
Board Edges:	Square
- B. Provide tapered insulation as shown on drawings of same type as flat insulation.

2.6 FLASHINGS

- A. Flexible Flashings: Same material as membrane.
- B. Counter Flashings: Same material as membrane.
- C. Reglet: As recommended by membrane manufacturer.

2.7 ACCESSORIES

- A. If another manufacturer is substituted, their equal components for the items listed below shall be submitted for approval.
- B. Pipe flashings: Carlisle Split Pipe Seals pipe flashing appropriate for each situation.
- C. Roof Drains: manufacturer's standard.
- D. At roof to wall intersections provide manufacturer's reinforced transition strips.
- E. Walkway Pads: Carlisle Sure-Weld Heat Weldable Walkway Rolls.
- F. Sealants: As recommended by membrane manufacturer.

- G. Roofing Nails: Galvanized, hot dipped or non-ferrous type, size as required to suit application
- H. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.
- I. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.
- J. Heavy gauge wall cap in color to be selected from manufacturer's standard selection during construction.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, and reglets are in place.

3.2 PREPARATION – OSB DECK

- A. Fasten insulation to OSB deck as recommended by manufacturer.
- B. Fasten recovery board as recommended by manufacturer.

3.3 MEMBRANE APPLICATION

- A. Apply membrane and adhesive in accordance with manufacturer's instructions.
- B. Roll out membrane, free from air pockets, wrinkles, or tears. Firmly press sheet into place without stretching.
- C. Overlap edges and ends and seal with Seam Tape, minimum 3 inches. Seal permanently waterproof.
- D. Shingle joints on sloped substrate in direction of drainage.
- E. Extend membrane a minimum of 12 inches up vertical surfaces.
- F. Seal membrane around roof penetrations.

3.4 FLASHINGS AND ACCESSORIES

- A. Apply Reinforced Transition Strips at roof wall intersections as recommended by manufacturer.
- B. Secure to nailing strips at 4 inches (100 mm) o.c. and reglets.
- C. Coordinate installation of roof drains plumbing and related flashings.
- D. Seal flashings and flanges of items penetrating membrane.
- E. Roof Cap: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.
- F. Install walkway pads in accordance with manufacturer's instructions and with three strips of Seam Tape, around all mechanical units and along a path from each roof access to mechanical units..

3.5 FIELD QUALITY CONTROL

- A. Correct identified defects or irregularities.

- B. Require site attendance of roofing and insulation materials' manufacturers as required for warranty during installation of the Work.

3.6 CLEANING

- A. In areas where finished surfaces are soiled by Work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- B. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.7 PROTECTION

- A. Protect building surfaces against damage from roofing work.
- B. Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION

SECTION 07600 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Sheet metal flashing and trim.
 - 2. Fasteners and attachment devices.
 - 3. Coatings and slip sheets to isolate sheet metal from dissimilar materials.
- B. Wood blocking, nailers, edge strips, and battens are not specified in this section.
- C. Related Sections:
 - 1. Siding: Elsewhere in Division 7.
 - 2. Rough carpentry: Division 6.
 - 3. Finish Carpentry: Division 6. Asphalt shingles: Elsewhere in Division 7.

1.3 REFERENCES

- A. Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA); 1987.
- B. ASTM B 209-92a -- Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 1992.
- C. FS TT-C-494B -- Coating Compound, Bituminous, Solvent Type, Acid Resistant; 1985.

1.4 QUALITY ASSURANCE

- A. Installer: A company familiar with installing products included in this section and which has completed at least 20 installations similar in scope to work included in this section.

- B. Quality Standard:
 - 1. Fabricate and install sheet metal work in accordance with Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA) "Architectural Sheet Metal Manual," unless specifically indicated otherwise.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Sheet: ASTM B 209, Type 3003 H14.
 - 1. Minimum thickness: 20 B & S gage (.032 inch) , unless indicated otherwise.
 - 2. All flashing to be vinyl coated.

2.2 ACCESSORY MATERIALS

- A. Fasteners: Corrosion-resistant metal of same material as the material being fastened, or other material recommended by sheet metal manufacturer. Match finish and color of exposed fastener heads to finish and color of sheet material being fastened.
- B. Sealant: As specified in Division 7.
 - 1. Use noncuring type for concealed joints.
 - 2. Use nonsag elastomeric type for exposed joints.
- C. Joint Adhesive: Two-component noncorrosive epoxy adhesive, recommended by metal manufacturer for sealing of nonmoving joints.
- D. Bituminous Coating: Heavy bodied, sulfur-free, asphalt-based paint; FS TT-C-494.

2.3 FABRICATION - GENERAL

- A. Form sheet metal to match profiles indicated, substantially free from oil-canning, fish-mouths, and other defects.
- B. Comply with SMACNA "Architectural Sheet Metal Manual" for applications indicated.
- C. Provide for thermal expansion of exposed sheet metal work exceeding 15 feet running length.
 - 1. Flashing and trim: Provide movement joints at maximum spacing of 10 feet; no joints allowed within 2 feet of corner or intersection.

- D. Conceal fasteners and expansion provisions wherever possible.
 - 1. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.
- E. Form a 1/2-inch hem on underside of exposed edges.
- F. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.
 - 1. Gage: As recommended by SMACNA or metal manufacturer for application, but in no case less than gage of metal being secured.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which products of this section are to be installed and verify that work may properly commence. Do not proceed with the work until unsatisfactory conditions have been fully resolved.
 - 1. Verify that nailers, blocking, and other attachment provisions for sheet metal work are properly located and securely fastened to resist effects of wind and thermal stresses.

3.2 PREPARATION

- A. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- B. Isolate dissimilar metals by means of a heavy bituminous coating, approved paint coating, adhered polyethylene sheet, or other means approved by the architect.

3.3 INSTALLATION

- A. General: Comply with sheet metal manufacturer's installation methods and recommendations in the SMACNA "Architectural Sheet Metal Manual."

- B. Sealed Joints: Form minimum 1-inch hooked joints and embed flange into sealant or adhesive. Form metal to completely conceal sealant or adhesive.
 - 1. Use joint adhesive for nonmoving joints specified not to be soldered.
 - 2. Moving joints: When ambient temperature is moderate (40-70 degrees F) at time of installation, set joined members for 50 percent movement either way. Adjust setting position of joined members proportionally for temperatures above 70 degrees F. Do not install sealant at temperatures below 40 degrees F. Refer to section on sealants elsewhere in Division 7 for handling and installation requirements for joint sealers.

3.4 CLEANING AND PROTECTION

- A. Repair or replace work which is damaged or defaced, as directed by the architect.
- B. Remove from sheet metal surfaces any debris or substances which will inhibit uniform weathering.
- C. Protect sheet metal work as recommended by the installer so that completed work will be clean, secured, and without damage at substantial completion.

END OF SECTION 07600

SECTION 07811 - SPRAYED FIRE-RESISTIVE MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exposed SFRM.
- B. Related Sections include the following:
 - 1. Division 5 Section "Structural Steel" for surface conditions required for structural steel receiving SFRM.

1.3 DEFINITIONS

- A. SFRM: Sprayed fire-resistive material.
- B. Exposed: Fire-resistive materials applied to surfaces that are exposed to view when the Work is completed, that are accessible through suspended ceilings and that are identified as exposed on Drawings.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Structural framing plans indicating the following:
 - 1. Locations and types of surface preparations required before applying SFRM.
 - 2. Extent of SFRM for each construction and fire-resistance rating, including the following:
 - a. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.

- b. Minimum thicknesses needed to achieve required fire-resistance ratings of structural components and assemblies.
 - 3. Treatment of SFRM after application.
- C. Product Certificates: For each type of SFRM, signed by product manufacturer.
- D. Qualification Data: For installer, manufacturer and testing agency.
- E. Compatibility and Adhesion Test Reports: From SFRM manufacturer indicating the following:
 - 1. Materials have been tested for bond with substrates.
 - 2. Materials have been verified by SFRM manufacturer to be compatible with substrate primers and coatings.
 - 3. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for proposed SFRM.
- G. Research/Evaluation Reports: For SFRM.
- H. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by SFRM manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements. A manufacturer's willingness to sell its SFRM to Contractor or to an installer engaged by Contractor does not in itself confer qualification on the buyer.
- B. Source Limitations: Obtain SFRM through one source from a single manufacturer.
- C. SFRM Testing: By a qualified testing and inspecting agency engaged by Contractor or manufacturer to test for compliance with specified requirements for performance and test methods.
 - 1. SFRMs are randomly selected for testing from bags bearing the applicable classification marking of UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

2. Testing is performed on specimens of SFRMs that comply with laboratory testing requirements specified in Part 2 and are otherwise identical to installed fire-resistive materials, including application of accelerant, sealers, topcoats, tamping, troweling, rolling, and water overspray, if any of these are used in final application.
 3. Testing is performed on specimens whose application the independent testing and inspecting agency witnessed during preparation and conditioning. Include in test reports a full description of preparation and conditioning of laboratory test specimens.
- D. Compatibility and Adhesion Testing: Engage a qualified testing and inspecting agency to test for compliance with requirements for specified performance and test methods.
1. Test for bond per ASTM E 736 and requirements in UL's "Fire Resistance Directory" for coating materials. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
 2. Verify that manufacturer, through its own laboratory testing or field experience, has not found primers or coatings to be incompatible with SFRM.
- E. Fire-Test-Response Characteristics: Provide SFRM with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify bags containing SFRM with appropriate markings of applicable testing and inspecting agency.
1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency acceptable to authorities having jurisdiction, for SFRM serving as direct-applied protection tested per ASTM E 119.
 2. Surface-Burning Characteristics: ASTM E 84.
- F. Provide products containing no detectable asbestos as determined according to the method specified in 40 CFR 763, Subpart E, Appendix E, Section 1, "Polarized Light Microscopy."
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Deliver products to Project site in original, unopened packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, shelf life if applicable, and fire-resistance ratings applicable to Project.

- B. Use materials with limited shelf life within period indicated. Remove from Project site and discard materials whose shelf life has expired.
- C. Store materials inside, under cover, and aboveground; keep dry until ready for use. Remove from Project site and discard wet or deteriorated materials.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply SFRM when ambient or substrate temperature is 40 deg F (4 deg C) or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.
- B. Ventilation: Ventilate building spaces during and after application of SFRM. Use natural means or, if they are inadequate, forced-air circulation until fire-resistive material dries thoroughly.

1.8 COORDINATION

- A. Sequence and coordinate application of SFRM with other related work specified in other Sections to comply with the following requirements:
 - 1. Provide temporary enclosure as required to confine spraying operations and protect the environment.
 - 2. Provide temporary enclosures for applications to prevent deterioration of fire-resistive material due to exposure to weather and to unfavorable ambient conditions for humidity, temperature, and ventilation.
 - 3. Avoid unnecessary exposure of fire-resistive material to abrasion and other damage likely to occur during construction operations subsequent to its application.
 - 4. Do not begin applying fire-resistive material until clips, hangers, supports, sleeves, and other items penetrating fire protection are in place.
 - 5. Defer installing ducts, piping, and other items that would interfere with applying fire-resistive material until application of fire protection is completed.
 - 6. Do not install enclosing or concealing construction until after fire-resistive material has been applied, inspected, and tested and corrections have been made to defective applications.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by Contractor and by Installer, in which manufacturer agrees to repair or replace SFRMs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Cracking, flaking, spalling, or eroding in excess of specified requirements; peeling; or delaminating of SFRM from substrates.
 - b. Not covered under the warranty are failures due to damage by occupants and Owner's maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, and other causes not reasonably foreseeable under conditions of normal use.
 - 2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EXPOSED SFRM

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Exposed Cementitious SFRM:
 - a. Flame Control Coatings, LLC; Flame Control No. 50-69CX.
 - b. Cafco, Blaze-Shield II.
- B. Material Composition: Manufacturer's standard product, as follows:
 - 1. Exposed Cementitious SFRM: Factory-mixed, dry, cement aggregate formulation; or chloride-free formulation of gypsum or portland cement binders, additives, and inorganic aggregates mixed with water at Project site to form a slurry or mortar for conveyance and application.
 - 2. Designated for exterior exposure.
- C. Physical Properties: Minimum values, unless otherwise indicated, or higher values required to attain designated fire-resistance ratings, measured per standard test methods referenced with each property as follows:

1. Dry Density: Values for average and individual densities as required for fire-resistance ratings indicated, per ASTM E 605 or AWC I Technical Manual 12-A, Section 5.4.5, "Displacement Method," but with an average density of not less than 28 lb/cu. ft. (352 kg/cu. m).
2. Bond Strength: 434 lbf/sq. ft. (21 kPa) minimum per ASTM E 736.
3. Compressive Strength: 51 lbf/sq. in. (351 kPa) minimum per ASTM E 761.
4. Corrosion Resistance: No evidence of corrosion per ASTM E 937.
5. Deflection: No cracking, spalling, or delamination per ASTM E 759.
6. Effect of Impact on Bonding: No cracking, spalling, or delamination per ASTM E 760.
7. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. (0.270 g/sq. m) per ASTM E 859.
8. Combustion Characteristics: Passes ASTM E 136.
9. Fire-Test-Response Characteristics: Provide SFRM with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. Flame-Spread Index: 10 or less.
 - b. Smoke-Developed Index: 0.
10. Fungal Resistance: No observed growth on specimens per ASTM G 21.
11. For exterior applications of SFRM, provide formulation listed and labeled by testing and inspecting agency acceptable to authorities having jurisdiction for surfaces exposed to exterior.

2.2 AUXILIARY FIRE-RESISTIVE MATERIALS

- A. General: Provide auxiliary fire-resistive materials that are compatible with SFRM and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: For use on each substrate and with each sprayed fire-resistive product, provide primer that complies with one or more of the following requirements:
 1. Primer's bond strength complies with requirements specified in UL's "Fire Resistance Directory" for coating materials based on a series of bond tests per ASTM E 736.
 2. Primer is identical to those used in assemblies tested for fire-test-response characteristics of SFRM per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

- C. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by manufacturer of intumescent mastic coating fire-resistive material. Include pins and attachment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of work. A substrate is in satisfactory condition if it complies with the following:
 - 1. Substrates comply with requirements in the Section where the substrate and related materials and construction are specified.
 - 2. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, incompatible paints, incompatible encapsulants, or other foreign substances capable of impairing bond of fire-resistive materials with substrates under conditions of normal use or fire exposure.
 - 3. Objects penetrating fire-resistive material, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
 - 4. Substrates are not obstructed by ducts, piping, equipment, and other suspended construction that will interfere with applying fire-resistive material.
- B. Conduct tests according to fire-resistive material manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fire-resistive materials during application.
- B. Clean substrates of substances that could impair bond of fire-resistive material, including dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, and incompatible primers, paints, and encapsulants.

- C. Prime substrates where recommended in writing by SFRM manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive SFRM.
- D. For exposed applications, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of SFRM. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION, GENERAL

- A. Comply with fire-resistive material manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and spray on fire-resistive material, as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.
- B. Apply SFRM that is identical to products tested as specified in Part 1 "Quality Assurance" Article and substantiated by test reports, with respect to rate of application, accelerator use, sealers, topcoats, tamping, troweling, water overspray, or other materials and procedures affecting test results.
- C. Install reinforcing mesh, as required, to comply with fire-resistance ratings and fire-resistive material manufacturer's written recommendations for conditions of exposure and intended use. Securely attach mesh to substrate in position required for support and reinforcement of fire-resistive material. Use anchorage devices of type recommended in writing by SFRM manufacturer. Attach accessories where indicated or required for secure attachment of mesh to substrate.
- D. Extend fire-resistive material in full thickness over entire area of each substrate to be protected. Unless otherwise recommended in writing by SFRM manufacturer, install body of fire-resistive covering in a single course.
- E. Spray apply fire-resistive materials to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by SFRM manufacturer.

3.4 APPLICATION, EXPOSED SFRM

- A. Apply exposed SFRM in thicknesses and densities not less than those required to achieve fire-resistance ratings designated for each condition, but apply in greater thicknesses and densities if indicated.
- B. Provide a uniform finish complying with description indicated for each type of material and matching Architect's sample or, if none, finish approved for field-erected mockup.
- C. Apply exposed cementitious SFRM to produce the following finish:
 - 1. Spray-textured finish with no further treatment.
- D. Cure exposed SFRM according to product manufacturer's written recommendations.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspection and prepare reports:
 - 1. SFRM.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.
 - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- C. Tests and Inspections: Testing and inspecting of completed applications of SFRM shall take place in successive stages, in areas of extent and using methods as follows. Do not proceed with application of SFRM for the next area until test results for previously completed applications of SFRM show compliance with requirements. Tested values must equal or exceed values indicated and required for approved fire-resistance design.
 - 1. Thickness for Structural Frame Members: From a sample of 25 percent of structural members per floor, taking 9 measurements at a single cross section for structural frame beams or girders, 7 measurements of a single cross section for joists and trusses, and 12 measurements of a single cross section for columns per ASTM E 605.
 - 2. If testing finds applications of SFRM are not in compliance with requirements, testing and inspecting agency will perform additional random testing to determine extent of noncompliance.

- D. Remove and replace applications of SFRM that do not pass tests and inspections for cohesion and adhesion, for density, or for both and retest as specified above.
- E. Apply additional SFRM, per manufacturer's written instructions, where test results indicate that thickness does not comply with specified requirements, and retest as specified above.

3.6 CLEANING, PROTECTING, AND REPAIR

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.
- B. Protect SFRM, according to advice of product manufacturer and Installer, from damage resulting from construction operations or other causes so fire protection will be without damage or deterioration at time of Substantial Completion.
- C. Coordinate application of SFRM with other construction to minimize need to cut or remove fire protection. As installation of other construction proceeds, inspect SFRM and patch any damaged or removed areas.
- D. Repair or replace work that has not successfully protected steel.

END OF SECTION 07811

SECTION 07 84 00 – FIRESTOPPING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes firestopping for through-penetrations through the following fire-resistance rated assemblies, including both blank openings and openings containing penetrating items:
 - 1. Floor-ceiling assemblies.
 - 2. Roof-ceiling assemblies.
 - 3. Walls and partitions.
 - 4. Smoke barriers.
 - 5. Construction enclosing compartmentalized areas.
- B. Work Not Included: Repairing penetrations made in error and repairing penetrations which are too large to be sealed by the methods indicated; these are to be repaired using the original material of the construction.
- C. Related Sections include the following:
 - 1. Division 3 – Section 03 30 00 – Cast-In-Place Concrete
 - 2. Division 4 – Section 04 22 00 – Concrete Unit Masonry
 - 3. Division 7 – Section 07 90 00 – Joint Protection
 - 4. Division 9 – Section 09 20 00 – Plaster and Gypsum Board
 - 5. Division 15 – Section 15300 – Plumbing
 - 6. Division 15 – Section 15400 – HVAC
 - 7. Division 16 – Section 16000 – Electrical

1.3 PERFORMANCE CRITERIA

- A. FIRE TEST REQUIREMENTS
 - 1. Underwriters Laboratories, Inc. (UL):
 - a. ANSI/ UL1479, "Fire Tests of Through Penetration Firestops".
 - b. ANSI/ UL2079, "Tests for Fire Resistance of Building Joint Systems".
 - c. ANSI/ UL263, "Fire Tests of Building Construction and Materials".
 - d. ANSI/ UL723, "Surface Burning Characteristics of Building Materials".

2. American Society of Testing and Materials (ASTM):
 - a. ASTM E-814, "Fire Tests of Through Penetration Fire Stops".
 - b. ASTM E-1966, "Test Method for Fire Resistive Joint Systems".
 - c. ASTM E-119, "Fire Tests of Building Construction and Materials".
 - d. ASTM E-84, "Surface Burning Characteristics of Building Materials".

B. REFERENCES

1. Underwriters Laboratories (UL) of Northbrook, IL "Fire Resistance Directory".
 - a. Through Penetration Firestop Systems (XHEZ)
 - b. Joint Systems (XHBN)
 - c. Fill, Void or Cavity Materials (XHHW)
 - d. Firestop Devices (XHJI)
 - e. Forming Materials (XHKU)
 - f. Wall Opening Protective Materials (CLIV)
2. All major building codes:
 - a. International Building Code published by ICC.
3. National Fire Protection Association (NFPA) of Quincy, MA "NFPA 101: Life Safety Code".
4. National Fire Protection Association (NFPA) of Quincy, MA "NFPA 70: National Electrical Code".
5. Factory Mutual Approvals (FM) of Norwood, MA "FM 4991: Standard for Approval of Firestop Contractors".

C. PERFORMANCE REQUIREMENTS

1. Where firestopping system also serves to seal a penetration through the thermal barrier of the building the firestopping system selected shall also seal the penetration against air movement through the opening.
2. Provide products that upon curing, do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
3. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
4. Pipe insulation shall not be removed, cut away or otherwise interrupted through wall or floor openings. Provide products appropriately tested for the thickness and type of insulation utilized.
5. Fire rated pathway devices shall be the preferred product and shall be installed in all locations where frequent cable moves, add-ons and changes will occur.

6. When mechanical cable pathways are not practical, openings within walls and floors designed to accommodate voice, data and video cabling shall be provided with re-enterable products specifically designed for retrofit.
7. Penetrants passing through fire-resistance rated floor-ceiling assemblies contained within chase wall assemblies shall be protected with products tested by being fully exposed to the fire outside of the chase wall. Systems within the UL Fire Resistance Directory that meet this criterion are identified with the words "Chase Wall Optional".
8. Provide fire-resistive joint sealants sufficiently flexible to accommodate movement such as thermal expansion and other normal building movement without damage to the seal.
9. Provide fire-resistive joint sealants designed to accommodate a specific range of movement and tested for this purpose in accordance with a cyclic movement test criteria as outlined in Standards, ASTM E-1399, ASTM E-1966 or ANSI/ UL 2079.
10. Provide fire-resistive joint systems subjected to an air leakage test conducted in accordance with Standard, ANSI/ UL2079 with published L-Ratings for ambient and elevated temperatures as evidence of the ability of the fire-resistive joint system to restrict the movement of smoke.

1.4 SUBMITTALS

- A. Product Data: For each type of firestopping product indicated.
- B. System Drawings: Submit documentation from a qualified third-party testing agency that is applicable to each firestopping system configuration for construction, joint opening width and/or penetrating items.
- C. Product Certificates: Certificate of conformance signed by manufacturers of firestopping products certifying that products comply with requirements.

1.5 QUALITY ASSURANCE

- A. Provide firestopping systems that comply with the following requirements and those specified in "Performance Criteria" Article:
 1. Firestopping tests are performed by a qualified, testing and inspection agency. A qualified testing and inspection agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 2. Firestopping products bear classification marking of qualified testing and inspection agency.

- B. Engage an experienced installer who is certified, licensed, FM Approved in accordance with FM 4991 or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install firestop products per specified requirements. A manufacturer's willingness to sell its firestopping products to Contractor or to an installer engaged by Contractor does not in itself confer qualifications on buyer.
- C. Obtain firestop systems for each type of penetration or joint opening and construction condition indicated from a single manufacturer.
- D. Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings".

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver firestopping products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying product and manufacturer, date of manufacture; lot number; shelf life, if applicable; qualified testing and inspection agency's classification marking; and mixing instructions for multicomponent materials.
- B. Store and handle materials for firestopping products to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.

1.7 PROJECT CONDITIONS

- A. Do not install firestopping products when ambient or substrate temperatures are outside limitations recommended by manufacturer.
- B. Do not install firestopping products when substrates are wet due to rain, frost, condensation, or other causes.
- C. Do not use materials that contain flammable solvents.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration firestop systems.
- C. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

PART 2 – PRODUCTS

2.1 FIRESTOPPING, GENERAL

- A. Provide firestopping products that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by firestopping products manufacturer based on testing and field experience.
- B. Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- C. Where firestopping system also serves to seal a penetration through the thermal barrier of the building the firestopping system selected shall also seal the penetration against air movement through the opening.

2.2 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with through-penetration firestop systems (XHEZ) and/or joint systems (XHBN) listed in Volume 2 of the UL Fire Resistance Directory, provide products of the following manufacturers as identified below:
 - 1. Specified Technologies, Inc. (STI), Somerville, New Jersey
800 – 992 – 1180
 - 2. Other manufacturers listed in the UL Fire Resistance Directory – Volume 2.

2.3 MATERIALS

- A. General: Use only firestopping products that have been tested for specific fire-resistance-rated construction conditions conforming to construction assembly type, penetrating item type or joint opening width and movement capabilities, annular space requirements, and fire-rating involved for each separate instance.
- B. Latex Sealants: Single component latex formulations that upon cure do not re-emulsify during exposure to moisture, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSS Intumescent Sealant
 - 2. Specified Technologies, Inc. (STI) SpecSeal Series LCI Intumescent Sealant
 - 3. Specified Technologies, Inc. (STI) SpecSeal Series LC Endothermic Sealant

4. Specified Technologies, Inc. (STI) SpecSeal Series AS Elastomeric Spray
 5. Specified Technologies, Inc. (STI) SpecSeal Series ES Elastomeric Sealant
- C. Firestop Devices: Factory-assembled steel collars lined with intumescent material sized to fit specific outside diameter of penetrating item, the following products are acceptable:
1. Specified Technologies, Inc. (STI) SpecSeal Series SSC Firestop Collars
 2. Specified Technologies, Inc. (STI) SpecSeal Series LCC Firestop Collars
- D. Fire Rated Cable Pathways: STI EZ-PATH™ Brand device modules comprised of steel raceway with intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable:
1. Specified Technologies Inc. (STI) EZ-PATH™ Fire Rated Pathway
- E. Wall Opening Protective Materials: Intumescent, non-curing pads or inserts for protection of electrical switch and receptacle boxes to reduce horizontal separation to less than 24" , the following products are acceptable:
1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty Pads
 2. Specified Technologies, Inc. (STI) SpecSeal Series EP PowerShield Insert Pads
- F. Firestop Putty: Intumescent, non-hardening, water resistant putties containing no solvents, inorganic fibers or silicone compounds, the following products are acceptable:
1. Specified Technologies, Inc. (STI) SpecSeal Series SSP Firestop Putty
- G. Wrap Strips: Single component intumescent elastomeric strips faced on both sides with a plastic film, the following products are acceptable:
1. Specified Technologies, Inc. (STI) SpecSeal Series RED Wrap Strip
 2. Specified Technologies, Inc. (STI) SpecSeal Series BLU Wrap Strip
- H. Firestop Pillows: Re-enterable, non-curing, mineral fiber core encapsulated with an intumescent coating contained in a flame retardant poly bag, the following products are acceptable:
1. Specified Technologies, Inc. (STI) SpecSeal Series SSB Firestop Pillows

- I. Mortar: Portland cement based dry-mix product formulated for mixing with water at Project site to form a non-shrinking, water-resistant, homogenous mortar, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) SpecSeal Series SSM Firestop Mortar

- J. Silicone Sealants: Moisture curing, single component, silicone elastomeric sealant for horizontal surfaces (pourable or nonsag) or vertical surface (nonsag), the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) Pensil 300 Silicone Sealant
 - 2. Specified Technologies, Inc. (STI) Pensil 300 SL Self-Leveling Silicone Sealant

- K. Silicone Foam: Multicomponent, silicone-based liquid elastomers, that when mixed, expand and cure in place to produce a flexible, non-shrinking foam, the following products are acceptable:
 - 1. Specified Technologies, Inc. (STI) Pensil 200 Silicone Foam

PART 3 – EXECUTION

3.1 PREPARATION

- A. Examination of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

- B. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, scale, laitance, rust, release agents, water repellents, and any other substances that may inhibit optimum adhesion.

- C. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.

- D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 FIRESTOPPING INSTALLATION

- A. General Requirements: Install through-penetration firestop systems and fire-resistive joint systems in accordance with "Performance Criteria" Article and in accordance with the conditions of testing and classification as specified in the published design.

- B. Manufacturer's Instructions: Strictly comply with manufacturer's instructions for installation of firestopping products.
 - 1. Seal all openings 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 through-penetration 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.
4. Apply a suitable bond-breaker to prevent three-sided adhesion in applications where this condition might occur such as the intersection of a gypsum wallboard/steel stud wall to floor or roof assembly where the joint is backed by a steel ceiling runner or track.
5. Where joint application is exposed to the elements, fire-resistive joint sealant must be approved by manufacturer for use in exterior applications and shall comply with ASTM C-920, "Specification for Elastomeric Joint Sealants".

3.3 FIELD QUALITY CONTROL

- A. Inspections: Owner shall engage a qualified independent inspection agency to inspect through-penetration firestop systems.
- B. Keep areas of work accessible until inspection by authorities having jurisdiction.
- C. Where deficiencies are found, repair or firestopping products so they comply with requirements.

3.4 ADJUSTING AND CLEANING

- A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- B. Clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling as work progresses.

3.5 PROTECTION

- A. Protect installed work during curing period.
- B. Protect installed work from damage from construction operations using substantial barriers if necessary.
- C. Repair damaged materials in accordance with manufacturer's instructions.

END OF SECTION 07 84 00

SECTION 07900 SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Contractor shall provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or herein, including all labor, materials, equipment and incidentals necessary and required for the completion of caulking.
- B. Scope of Work (for sealant types refer to section 2.1.5):
 - 1. Exterior Joints
 - a. Vertical joints which are bordered on one or both sides by a I) porous building material such as concrete, natural stone (marble, granite, limestone, etc.) or masonry or ii) non-porous building material such as painted metal, anodized aluminum, mill finish aluminum, PVC or porcelain tile. Seal with Type 1 sealant.
 - b. Vertical joints which are bordered on one or both sides by an Exterior Insulation and Finish System (EIFS). Seal with Type 2 or Type 9 sealant.
 - c. Vertical joints which are bordered on one or both sides by glass. Seal with Type 4 sealant.
 - d. Horizontal expansion joints in sidewalks, terraces, decks, concrete floors, driveways and parking garages. Seal with Type 5 sealant.
 - e. All joints between mechanical/electrical penetrations and all types of siding. Seal with Type 4 sealant.
 - f. All joints in fiber cement siding and wood siding. Seal with Type 2 or 3 sealant.
 - g. All joints in PVC trim. Seal with Type 4 sealant.
 - h. Window casing to vinyl siding joints. Seal with Type 4 sealant.

2. Interior Joints

- a. Vertical expansion, control and air seal joints. Seal with Type 3 sealant.
 - b. Trim, cabinets, countertops and finish joints experiencing minimal movement. Seal with Type 8 sealant.
 - c. Sanitary applications for all bathroom joints and kitchen countertops. Seal with Type 6 sealant.
 - d. Horizontal joints. Seal with Type 5 sealant.
 - e. Gypsum wallboard Acoustical Sealant. Use Type 7 sealant.
- C. Joints of a nature similar to that of joints indicated on the schedule shall be sealed with same sealer, whether indicated on drawings to be sealed or not.
- D. Related work included elsewhere to be performed in compliance with this section:
1. Division 3 - Concrete
 2. Division 4 - Masonry
 3. Division 7 - Thermal & Moisture Protection
 4. Division 8 - Doors & Windows
 5. Division 9 - Finishes
 6. Division 10 – Specialties

1.3 QUALIFICATIONS

- A. Installation of sealant and caulking work shall be carried out by a recognized specialized applicator having skilled mechanics, thoroughly trained and competent in all phases of caulking work.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials to the jobsite in their original unopened containers, with all labels intact.
- B. Store materials in strict accordance with manufacturer's recommendations.

1.5 ENVIRONMENTAL CONDITIONS

- A. Apply sealants only to completely dry surfaces, and at air, substrate and material temperatures above minimum established by manufacturer's specifications.
- B. Dow Corning silicone sealants can be applied in temperatures ranging from -20F to 120F.

1.6 SUBMITTALS

- A. Product data: Manufacturer's data on each joint sealer, with instructions for substrate preparation and installation.
 - 1. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.
(www.SWRIONLINE.org)
- B. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.
- C. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- D. Field Test Report Log: For each elastomeric sealant application.
- E. Warranties: Special warranties specified in this Section.

1.7 MOCK-UP

- A. Construct mock-ups of each sealant type to show location, size, shape, color and depth of joints complete with back-up material, primer and sealant. Mock-up may be part of finished work.
- B. Provide for scheduled Architect's site visit before proceeding with work.

1.8 GUARANTEE

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
- B. Workmanship Warranty: 3years from date of Substantial Completion.
- C. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

- D. Available Manufacturers Warranty:
 - 1. Warranty Period for 5 years limited for Dow Corning Contractors Weatherproofing Sealant.
 - 2. Warranty Period for 20 years limited for Dow Corning 790 and 795 Silicone Building Sealant.
 - 3. 20 year Non-stain warranty for Dow Corning 790, Dow Corning 795 Silicone Building Sealant.
- E. Defective work shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjoining or adjacent work or surfaces.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacturer: The design is based on the manufacturer listed. Comparable products of the manufacturers listed will be considered for substitution:
 - 1. Tremco
 - 2. Dow Corning
- B. General: Provide only products which are recommended and approved by their manufacturer for the specific use to which they are put and which comply with all requirements of the contract documents.
 - 1. Provide only materials which are compatible with each other and with joint substrates.
 - 2. Colors of exposed sealers: As selected by the architect from manufacturer's standard colors.

2.2 MATERIALS

- A. Primers are to be type recommended by sealant manufacturer.
- B. Joint backing material shall be i) vertical surfaces (excluding EIFS) - Sof Rod an extruded polyolefin foam by Tremco Ltd. And ii) horizontal surfaces and EIFS surfaces - Standard Backer Rod a closed cell polyethylene foam by Tremco Ltd.
- C. Bond breaker, where joint configuration does not allow for proper depth/width ration (see Section 3.2.5) - a pressure sensitive plastic tape, which will not bond to the sealant such as 3M #226 or #481 or Valley Industries #40 shall be placed at the back of the joint.

- D. Use sealant(s) specified below:
1. Type 1: Medium modulus, moisture curing, one part silicone sealant meeting the specified requirements of the specifications below.
 - a. Use in glass to glass, glass to metal and metal to metal curtainwall joints, exterior siding joints, PVC trim joints and window casing to vinyl siding joints.
 - b. ASTM C920, Type S, Grade NS, Class 25, uses NT, G, A, O.
 - c. TT-S-001534A (COM-NBS) Interim Federal Specification for Sealing Compound: Silicone Rubber Base (for Sealant and Glazing in Buildings and Other Structures).
 - d. Joint movement capability +/- 50%
 - e. Non staining
 - f. SWRI validated at 50% movement (independent testing).
 - g. Products:
 - (1) Dow Corning 795
 - (2) Dow Corning 791
 - (3) Tremco Spectrem 2
 2. Type 2: Ultra low modulus, one component, moisture curing silicone sealant.
 - a. ASTM C-920, Type S, Grade NS, Class 25, Uses NT, M, A, O.
 - b. TT-S-00230C (COM-NBS) Interim Federal Specification for Sealing Compound: Elastomeric Type, Single-Component (for Caulking, Sealing and Glazing in Buildings and Other Structures)
 - c. Joint movement capability: plus 100%, Minus 50%.
 - d. Non Staining
 - e. SWRI validated at 100% movement (independent testing)
 - f. Products:
 - (1) Dow Corning 790
 - (2) Tremco Spectrem 1
 3. Type 3: Medium modulus, moisture curing, one part silicone sealant (5 year warranty). Use at all locations, except where another type is specified.
 - a. Use in glass to glass, glass to metal and metal to metal, exterior siding joints, Mortar, PVC trim joints and window casing to vinyl siding joints.
 - b. ASTM C920, Type S, Grade NS, Class 25, uses NT, G, A, O.
 - c. TT-S-001534A (COM-NBS) Interim Federal Specification for Sealing Compound: Silicone Rubber Base (for Sealant and Glazing in Buildings and Other Structures).
 - d. Joint movement capability +/- 40%
 - e. Non staining

- f. SWRI validated at 40% movement (independent testing).
- g. Products:
 - (1) Dow Corning (CWS) Contractors Weatherproofing Sealant
- 4. Type 4: Multi-component, polyepoxide urethane sealant. Use at all locations, except where another type is specified.
 - a. Product:
 - (1) Tremco DYmeric
- 5. Type 5: Low modulus, multi-component, oligomeric polyurethane sealant. Use on all EIFS joints, fiber cement joints, wood siding joints and at other locations as shown on the drawings.
 - a. Product:
 - (1) Tremco DYmeric 240 FC
- 6. Type 6: One part moisture curing polyurethane sealant or one part silicone. Dymonic or Dymonic FC by Tremco Ltd and Dow Corning CWS silicone sealant. Use on all fiber cement joints and wood siding joints.
 - a. Products:
 - (1) Dow Corning (CWS) Contractors Weatherproofing Sealant
 - (2) Tremco Dymonic
- 7. Type 7: Multi-component or single component self leveling or slope grade polyurethane sealant. Meeting the specified requirements of ASTM C920, Type M, Grade P, Class 25, Use T, M, A and O. THC 900 or THC 901 hybrid. Use in exterior and interior horizontal traffic joints. For areas where the slope of the deck makes self leveling material impractical THC 901 by Tremco Ltd. may be used.
 - a. Products:
 - (1) Tremco Vulkem 245
 - (2) Tremco Vulkem 45
- 8. Type 8: Mildew resistant, one component neutral cure silicone sealant. Tremsil 200 White by Tremco Ltd. Use on fixtures, bathtubs, vanity tops and kitchen countertops.
 - a. Product:
 - (1) Tremco Tremsil 200 White
- 9. Type 9: One component, non-skinning, non-hardening acoustical sealant. Use at all vapor barrier joints and openings in drywall systems as shown on the drawings or specified.
 - a. Product:
 - (1) Tremco Acoustical Sealant

10.Type 10: One component, paintable acrylic latex sealant. Use in interior non-moving joints that may be painted.

a. Product:

(1) Tremco Tremflex 834

- E. Cleaning material for surfaces to receive sealant as recommended by the manufacturer of sealant.
- F. Tooling Agents: Approved by sealant manufacturer; nonstaining to sealant and substrate.
- G. Masking Tape: Nonabsorbent, nonstaining.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify at the site that joints and surfaces have been provided and that joint conditions will not adversely affect execution, performance or quality of completed work; and that they can put into acceptable condition by means of preparation specified in this section.
- B. Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond of the sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and adhesion, if necessary.
- C. Verify that specified environmental conditions exist before commencing work.
- D. Ensure that releasing agents, coatings, or other treatments have either not been applied to joint surfaces or that they are entirely removed.
- E. Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the work of this section.

3.2 PREPARATION

- A. Remove dust, paint, loose mortar and other foreign matter and dry joint surfaces.
- B. Remove dust, silt, scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

- C. Remove oil, grease and other coatings from non-ferrous metals with approved cleaning solvent.
- D. Examine joint sizes and correct as required to allow for anticipated movement and to achieve proper width/depth ratio per manufacturer's recommendations for specified sealant.
- E. Install joint backing material in all joints including but not limited to countertop/wall and cabinet/wall joints.
- F. Apply bond breaker tape to achieve correct joint depth and prevent three-sided adhesion.
- G. Where necessary to protect adjacent surfaces, mask adjacent surfaces with tape prior to priming and/or caulking.
- H. Prime sides of joint using two cloth method in accordance with manufacturer's directions, immediately prior to caulking.
- I. Before any caulking or sealing is commenced, a test of the material shall be made for indications of staining, poor adhesion or other undesirable effects.

3.3 APPLICATION

- A. Do not proceed with installation until the mock up is approved.
- B. Apply sealants in accordance with manufacturer's instructions ensuring to fill voids and joints completely.
- C. Install backers at depth required to result in shape and depth of installed sealant which allows the most joint movement without failure.
 - 1. Make backers continuous, without gaps, tears, or punctures.
 - 2. Do not stretch or twist backers.
- D. Use bond breaker tape where indicated and wherever it is necessary to keep sealant from adhering to back or third side of joint.
- E. Neatly tool surface to a slight concave profile. Surface of sealant to be smooth, free from ridges, wrinkles, air pockets and embedded impurities.

3.4 CLEANING

- A. Clean adjacent surfaces immediately and leave work neat and clean. Remove excess and droppings using recommended cleaners as work progresses. Remove masking tape immediately after tooling of joints.

END OF SECTION

DIVISION 8

Doors & Windows



SECTION 08110 - STEEL DOORS AND STEEL FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Standard steel doors and frames.
 - 2. Assemblies for fire-rated openings.
 - 3. Insulated doors.
- B. Related Sections:
 - 1. Wood doors for installation in steel frames: Elsewhere in Division 8.
 - 2. Door hardware: Elsewhere in Division 8.
 - 3. Glass and glazing: Elsewhere in Division 8.
 - 4. Steel doors in wood frames: Elsewhere in Division 8.
 - 5. Painting: Division 9.

1.3 REFERENCES

- A. ASTM A 153-82(87) -- Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 1982 (Reapproved 1987).
- B. ASTM A 366/A 366M-91(93) -- Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality; 1991 (Reapproved 1993).
- C. ASTM A 525-93 -- Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process; 1993.
- D. ASTM A 526/A 526M-90 -- Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality; 1990.
- E. ASTM A 568/A 568M-93a -- Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for; 1993.

- F. ASTM A 569/A 569M-91a -- Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality; 1991.
- G. ASTM A 591/A 591M-89 -- Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications; 1989.
- H. ASTM C 236-89(93) -- Standard Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot Box; 1989 (Reapproved 1993).
- I. ASTM E 152-81a -- Standard Methods of Fire Tests of Door Assemblies; 1981.
- J. DHI A115 Series -- Specifications for Steel Door and Frame Preparation for Hardware; 1980-91.
- K. NFPA 80 -- Standard for Fire Doors and Windows; National Fire Protection Association; 1992 (with Errata dated October 6, 1992).
- L. SDI 100-1991 -- Recommended Specifications: Standard Steel Doors and Frames; Steel Door Institute; 1991.
- M. SDI 105-92 -- Recommended Erection Instructions for Steel Frames; Steel Door Institute; 1992.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product information indicating compliance with specified requirements.
- B. Shop Drawings: Submit drawings for fabrication and installation of steel doors and frames, including the following information:
 1. Details of construction, joints, and connections.
 2. Details of each frame type, including anchorage.
 3. Elevations of each opening type.
 4. Conditions at openings, including coordination with glass and glazing requirements.
 5. Location and installation requirements of door hardware and reinforcements.
 6. Schedule of openings coordinated with numbering system used in contract documents.

- C. Quality Assurance Certification: Submit manufacturer's certification that products have been constructed and tested in full compliance with ANSI/SDI 100. As applicable, include test reports for core construction and reinforcing methods not specifically designated as acceptable by ANSI/SDI 100.

1.5 QUALITY ASSURANCE

- A. Quality Standard: Comply with SDI 100.
- B. Labeled Assemblies: At all locations where fire-rated door and frame assemblies are required, provide assemblies which comply with NFPA 80 and have been tested and labeled in accordance with ASTM E 152 by agency acceptable to governing authorities.
 - 1. Temperature rise rating: For fire-rated doors in stairwell enclosures, provide door construction tested and certified to limit temperature rise in thirty minutes to 450 degrees, F.
- C. Coordination: Transmit copy of final shop drawings to wood door manufacturer to allow prefabrication of wood doors to steel frames.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in crates or cartons suitable for storage at the site.
- B. Replace items damaged in delivery, unless damage is minor and can be repaired to match intact items, as determined by architect.
- C. Store products under cover, raised above ground level, and stacked to prevent warping and to promote air circulation.
 - 1. Prevent moisture from accumulating and remove saturated packaging before products can be damaged.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide products complying with requirements of the contract documents and made by one of the following:
 - 1. Benchmark
 - 2. Ceco Door Products.
 - 3. Curries Company/Essex Industries, Inc.
 - 4. Republic Builders Products Division/DESCO.
 - 5. Steelcraft.
 - 6. Therma-Tru.

- B. Substitutions: Comparable products of other manufacturers will be considered under standard substitution procedures.

2.2 MATERIALS

- A. Steel Sheets, Hot-Rolled: ASTM A 569 and ASTM A 568, commercial quality, pickled and oiled.
- B. Steel Sheets, Cold-Rolled: ASTM A 366 and ASTM A 568, commercial quality, matte finish exposed, oiled.
- C. Steel Sheets, Galvanized: ASTM A 591, electrolytic zinc-coated, Class A, mill phosphatized.
- D. Anchorages: Galvanized steel, minimum 18 gage.
- E. Fasteners and Inserts: Units standard with manufacturer.
 - 1. Exterior walls: ASTM A 153, hot-dip galvanized, Class C or D.
- F. Paint:
 - 1. Primer: Manufacturer's standard rust-inhibitive coating, suitable to receive finish coatings specified.

2.3 FABRICATION

- A. General: Shop-fabricate assemblies to greatest extent possible, assuring that installed units will be without warp, twist, bow, or other defect in appearance or function.
- B. Exposed Door Faces: Fabricate from cold-rolled steel.
- C. Frames: Fabricate from cold-rolled or hot-rolled steel.
- D. Edge Channels, Stiffeners, and Reinforcement: Fabricate from cold-rolled or hot-rolled steel.
- E. Seal top and bottom edges integrally with door construction, or use minimum 16 gage steel channels to form flush closure.
- F. Exterior Frames: Fabricate from galvanized steel.
- G. Exposed Screws and Bolts: Where required, provide only countersunk, flat Phillips-head fasteners.

- H. Hardware Preparation: Comply with DHI A115 series specifications for door and frame preparation, using final hardware schedule and templates from hardware supplier.
 - 1. Reinforcement: Reinforce doors and frames for field-installed exposed hardware items.
 - 2. Locations: Comply with final shop drawings.
- I. Shop Painting:
 - 1. Preparation: Clean surfaces thoroughly before beginning painting operations, removing rust, scale, oil, grease, and other contaminants.
 - 2. Primer: Apply primer evenly to achieve full protection of all exposed surfaces.

2.4 STEEL DOORS

- A. Refer to the drawings for door types.
- B. Mechanical Closet Door: Therma-Tru, 12-24 TR, 24 gauge insulated 6 panel door.
- C. General: Fabricate steel doors in accordance with requirements of SDI 100.

2.5 STEEL FRAMES

- A. General: Fabricate steel frames for scheduled openings.
 - 1. Frames: Double rabbet.
 - a. Interior doors: 1/2" profile both sides.
 - b. Exterior Entry Doors: 1/2" profile both sides. Transom openings to be non rabbeted frames. Provide glazing stop at mid point of frame to allow for Beechcraft transom frames to be installed over. See Section 08115 for glazing stops and muntins information..
 - 2. Minimum gage: As scheduled.
 - 3. Construction:
 - a. Interior doors: Mitered and mechanically fastened corners. Concealed fasteners as permitted.
 - b. Exterior Entry Doors: Mitered and welded corners. Concealed fasteners as permitted.
- B. Door Silencers: Drill stops to receive silencers, except on frames scheduled for weatherstripping.
 - 1. Provide for 3 silencers on strike jambs of single-swing frames.
 - 2. Provide for 2 silencers on heads of frames for pairs of doors.

- C. Guards: Weld protective covers to back of hardware openings at locations where grout, plaster, or other materials might interfere with hardware operation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories to comply with manufacturer's recommendations.
 - 1. Comply with detailed installation requirements of final shop drawings.
- B. Frame Installation:
 - 1. General: Adhere to provisions of SDI 105.
 - 2. Place frames after construction of enclosing elements to achieve plumb, planar installation. Leaving frames in smooth, undamaged condition.
 - 3. Anchors: Provide anchors per manufacturer's instructions.
 - 4. Fire-rated openings: Comply with requirements of NFPA 80.
 - 5. Wood stud partitions: Attach wall anchors to wood stud framing with screws.
- C. Door Installation:
 - 1. General: Comply with requirements and clearances specified in SDI 100.
 - 2. Fire-rated doors: Comply with NFPA 80 requirements and clearances.

3.2 ADJUST AND CLEAN

- A. Touch-Up: At locations where primer has been abraded or minor rusting has occurred, sand smooth and spray-apply compatible primer.
- B. Final Operating Adjustments: Check hardware at all openings for proper operation of doors, making final corrections as required to assure that work of this section is complete and undamaged.

END OF SECTION 08110

SECTION 08115 – FIBERGLASS DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fiberglass insulated doors.
 - 2. Prefitting by supplier.
- B. Related Sections:
 - 1. Metal door frames: Elsewhere in Division 8.
 - 2. Door hardware: Elsewhere in Division 8.
 - 3. Painting: Division 9.

1.3 REFERENCES

- A. Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program; Architectural Woodwork Institute (AWI); 1988.
- B. ASTM E 152-81a -- Standard Methods of Fire Tests of Door Assemblies; 1981.
- C. How to Store, Handle, Finish, Install and Maintain Wood Doors; National Wood Window and Door Association (NWWDA); undated.
- D. NFPA 80 -- Standard for Fire Doors and Windows; National Fire Protection Association; 1992 (and Errata dated October 6, 1992).
- E. NWWDA I.S. 1-87 -- Wood Flush Doors; National Wood Window and Door Association; 1987.

1.4 SUBMITTALS

- A. Product Data: Submit detailed technical information for each distinct product specified in this section.

- B. Shop Drawings: Prepare and submit shop drawings showing all relevant information, including:
 - 1. Dimensions and location of each product specified.
 - 2. Construction details for each distinct product type.
 - 3. Dimensions and location of blocking for hardware.
- C. Certification: Submit AWI "Architectural Quality Certification Program" Inspection Service Report; on-site inspection is not required.
- D. Preinstallation Report: Submit report indicating compliance with examination requirements specified in "Part 3."

1.5 QUALITY ASSURANCE

- A. Manufacturer: Member of AWI.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products as required to prevent damage or deterioration. Conform to manufacturer's recommendations, requirements of referenced standard, and recommendations of NWWDA I.S.1, Appendix, "How to Store, Handle, Finish, Install, and Maintain Wood Doors."
- B. Clearly label each door with opening number where door will be installed. Use removable, temporary labels or mark on door surface which will be concealed from view after installation.
 - 1. Coordinate door identification with shop drawing designations.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Do not deliver or install products of this section before building's design temperature and humidity levels have been achieved and will be maintained at those levels.

1.8 WARRANTIES

- A. Manufacturer's Warranty: Submit a written warranty signed by the manufacturer guaranteeing to correct failures in products which occur within the warranty period indicated below, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents. Failures are defined to include faulty workmanship; stile, rail, or core show-through (telegraphing); and warp (including bow, cup, and twist). Correction may include repair or replacement. Correct failures which occur within the following warranty period(s) after substantial completion:
1. Lifetime.

PART 2 - PRODUCTS

2.1 FIBERGLASS INSULATED DOORS

- A. Glass and Panel Door and matching sidelite:
1. Model: Therma-Tru FC65, FC63SL door leafs only.
 2. Finish: Factory primed, opaque finish specified elsewhere.
 3. Construction: Manufacturer's standard.
 4. Core: Solid polyurethane.

2.2 ACCESSORIES

- A. Glazing Stops and Muntins.
1. To be provided for light kits in doors, side lights and transoms in hollow metal frames.
 2. Hollow metal frame at transom to be fabricated without rabbet.
 3. Beechcraft, Door Molding with glazing stop and muntins secured as a complete unit.
 - a. Center routed out to allow for glazing thickness.
 - b. Mahogany on exterior doors.
 - c. Red Rider on interior doors.
- B. Glazing
1. Minimum 1/2" insulated tempered glass.
 2. Glazing to be provided with between the glass muntins in pattern shown.

2.3 FABRICATION

- A. Doors: Fabricate to provide consistent clearances as indicated.

1. Hinge and lock edges: Provide 1/8-inch standard bevel at edges, unless standard bevel would not precisely match hardware bevel; provide proper bevel for hardware.
 2. Make neat mortises and cutouts for door hardware indicated.
 3. Prefitting: Fabricate and trim doors to size to coordinate with frame shop drawings and floor finishes as indicated in the finish schedule.
 4. Premachining: Make all mortises and cutouts required for hardware at the factory to conform to approved hardware schedule, hardware templates, and door frame shop drawings.
- B. Doors to Receive Finish Specified Elsewhere: Coordinate shop priming with requirements for field-applied finishes; prime doors at factory using appropriate products.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect door frames and doors before beginning door installation.
1. Verify that frames are properly installed and aligned and are capable of providing trouble free support for doors throughout range of door swing.
 2. Do not install damaged or defective doors.
- B. Submit written report describing examination that has been performed and any conditions not conforming to requirements.
- C. Correct unsatisfactory conditions before installing products of this section. Commencement of installation indicates acceptance of conditions.

3.2 INSTALLATION

- A. Hardware Installation: Elsewhere in Division 8.
- B. Install doors in accordance with manufacturer's recommended procedures and requirements of referenced standard.
- C. Prefit Doors: Minimize field fitting to those procedures which are necessary to complete work unfinished during factory prefitting and to provide trouble free operation.
- D. Fitting of Doors:
1. Accurately align and fit doors for trouble free operation throughout range of door swing.

- E. Clearances:
 - 1. Clearance between door edge and head: 1/8 inch.
 - 2. Clearance between door edge and jamb: 1/8 inch.
 - 3. Clearance between door bottom edge and top surface of threshold: 1/4 inch.
 - 4. Clearance between door bottom edge and floor covering surface or finish (where threshold is not indicated): 1/8 inch.
 - 5. Clearance between meeting edges at pairs of doors: 1/8 inch.

- F. Field-Applied Finishes: Requirements are specified in Division 9.

3.3 ADJUSTING

- A. Adjust doors for proper operation; coordinate with hardware adjustment; replace doors which cannot be properly adjusted.

- B. Restore door finishes damaged during installation, in a manner which results in the door showing no evidence of the restoration. If refinished door cannot be made to match other doors, refinished door must be replaced at the contractor's expense.

- C. Protect installed work.

END OF SECTION 08115

SECTION 08210 - WOOD DOORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid core wood-faced or hardboard-faced doors.
 - 2. Shop priming of doors which are to receive finish specified elsewhere.
 - 3. Prefitting by manufacturer.
 - 4. Premachining by manufacturer.
- B. Related Sections:
 - 1. Metal door frames: Elsewhere in Division 8.
 - 2. Door hardware: Elsewhere in Division 8.
 - 3. Painting: Division 9.

1.3 REFERENCES

- A. Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program; Architectural Woodwork Institute (AWI); 1988.
- B. ASTM E 152-81a -- Standard Methods of Fire Tests of Door Assemblies; 1981.
- C. How to Store, Handle, Finish, Install and Maintain Wood Doors; National Wood Window and Door Association (NWWDA); undated.
- D. NFPA 80 -- Standard for Fire Doors and Windows; National Fire Protection Association; 1992 (and Errata dated October 6, 1992).
- E. NWWDA I.S. 1-87 -- Wood Flush Doors; National Wood Window and Door Association; 1987.

1.4 SUBMITTALS

- A. Product Data: Submit detailed technical information for each distinct product specified in this section.
- B. Shop Drawings: Prepare and submit shop drawings showing all relevant information, including:
 - 1. Dimensions and location of each product specified.
 - 2. Construction details for each distinct product type.
 - 3. Dimensions and location of blocking for hardware.
 - 4. Fire ratings.
- C. Certification: Submit AWI "Architectural Quality Certification Program" Inspection Service Report; on-site inspection is not required.
- D. Preinstallation Report: Submit report indicating compliance with examination requirements specified in "Part 3."

1.5 QUALITY ASSURANCE

- A. Flush Doors: Conform to the following, hereinafter referred to as referenced standard(s):
 - 1. NWWDA I.S. 1: "Wood Flush Doors," National Wood Window and Door Association (NWWDA).
 - 2. "Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program," including Section 1300, "Architectural Flush Doors," Architectural Woodwork Institute (AWI).
 - a. Where the AWI standard indicates requirements that conflict with the NWWDA standard, comply with AWI.
- B. NWWDA Hallmark: Each door must bear the NWWDA Wood Flush Door Certification Hallmark.
- C. Molded-Hardboard-Faced Doors: Conform to NWWDA I.S. 1.
- D. Fire-Rated Doors:
 - 1. Provide doors which are precise duplicates of doors tested as part of fire-rated assemblies in accordance with requirements of ASTM E 152.
 - 2. Acceptable testing and inspection agencies:
 - a. Underwriters Laboratories Inc.
 - b. Warnock Hersey International Inc.
- E. Manufacturer: Member of AWI.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products as required to prevent damage or deterioration. Conform to manufacturer's recommendations, requirements of referenced standard, and recommendations of NWWDA I.S.1, Appendix, "How to Store, Handle, Finish, Install, and Maintain Wood Doors."
- B. Clearly label each door with opening number where door will be installed. Use removable, temporary labels or mark on door surface which will be concealed from view after installation.
 - 1. Coordinate door identification with shop drawing designations.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Do not deliver or install products of this section before building's design temperature and humidity levels have been achieved and will be maintained at those levels.

1.8 WARRANTIES

- A. Manufacturer's Warranty: Submit a written warranty signed by the manufacturer guaranteeing to correct failures in products which occur within the warranty period indicated below, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents. Failures are defined to include faulty workmanship; stile, rail, or core show-through (telegraphing); and warp (including bow, cup, and twist). Correction may include repair or replacement. Correct failures which occur within the following warranty period(s) after substantial completion:
 - 1. Solid core wood-faced interior doors: 2 years.

PART 2 - PRODUCTS

2.1 WOOD DOORS - GENERAL REQUIREMENTS

- A. Fire Rated Doors:
 - 1. Construction: Conform to testing agency requirements for indicated fire rating.
 - 2. Labels: Permanently affixed to hinge stile.

2.2 SOLID CORE WOOD-FACED DOORS

- A. Manufacturers:
 - 1. Provide products complying with requirements of the contract documents and made by one of the following:
 - a. Mohawk Doors, Inc.
 - b. Masonite Doors, Inc.

- B. Solid Core Wood-Faced Flush Door :
 - 1. Label: As indicated on the drawings.
 - 2. Faces: Hardboard, manufacturer's standard.
 - 3. Finish: Factory primed, opaque finish specified elsewhere.
 - 4. Grade: AWI Custom.
 - 5. Construction: Manufacturer's standard.
 - 6. Prime-painted metal stops.

- C. Solid Core Wood-Faced Panel Door :
 - 1. Label: As indicated on the drawings.
 - 2. Faces: 2-panel style hardboard, smooth finish.
 - 3. Finish: Factory primed, opaque finish specified elsewhere.
 - 4. Grade: AWI Custom.
 - 5. Construction: Manufacturer's standard.
 - 6. Core: Particle and mineral core; manufacturer's standard construction.

2.3 ACCESSORIES

- A. Stops for Glazing and Louvers:
 - 1. For fire rated doors: Cold-rolled sheet steel of gage approved by testing agency for installation in fire-rated doors indicated.
 - 2. Prime-painted steel: Shop prime to receive finish specified elsewhere.

2.4 FABRICATION

- A. Doors: Fabricate to provide consistent clearances as indicated.
 - 1. Hinge and lock edges: Provide 1/8-inch standard bevel at edges, unless standard bevel would not precisely match hardware bevel; provide proper bevel for hardware.
 - 2. Make neat mortises and cutouts for door hardware indicated.
 - 3. Prefitting: Fabricate and trim doors to size at factory to coordinate with frame shop drawings and floor finishes as indicated in the finish schedule.

4. Premachining: Make all mortises and cutouts required for hardware at the factory to conform to approved hardware schedule, hardware templates, and door frame shop drawings.
- B. Doors to Receive Finish Specified Elsewhere: Coordinate shop priming with requirements for field-applied finishes; prime doors at factory using appropriate products; apply stain, first coat of paint system, or other sealing product as required.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect door frames and doors before beginning door installation.
 1. Verify that frames are properly installed and aligned and are capable of providing trouble free support for doors throughout range of door swing.
 2. Do not install damaged or defective doors.
- B. Submit written report describing examination that has been performed and any conditions not conforming to requirements.
- C. Correct unsatisfactory conditions before installing products of this section. Commencement of installation indicates acceptance of conditions.

3.2 INSTALLATION

- A. Hardware Installation: Elsewhere in Division 8.
- B. Install doors in accordance with manufacturer's recommended procedures and requirements of referenced standard.
 1. Fire-rated doors: Comply with NFPA 80 requirements.
- C. Prefit Doors: Minimize field fitting to those procedures which are necessary to complete work unfinished during factory prefitting and to provide trouble free operation.
- D. Fitting of Doors:
 1. Accurately align and fit doors for trouble free operation throughout range of door swing.
- E. Clearances:
 1. Clearance between door edge and head: 1/8 inch.

2. Clearance between door edge and jamb: 1/8 inch.
3. Clearance between door bottom edge and top surface of threshold: 1/4 inch.
4. Clearance between door bottom edge and floor covering surface or finish (where threshold is not indicated): 1/8 inch.
5. Clearance between meeting edges at pairs of doors: 1/8 inch.

F. Field-Applied Finishes: Requirements are specified in Division 9.

3.3 ADJUSTING

- A. Adjust doors for proper operation; coordinate with hardware adjustment; replace doors which cannot be properly adjusted.
- B. Restore door finishes damaged during installation, in a manner which results in the door showing no evidence of the restoration. If refinished door cannot be made to match other doors, refinished door must be replaced at the contractor's expense.
- C. Protect installed work.

END OF SECTION 08210

SECTION 08305 – ROOF ACCESS DOOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Fire-rated attic access doors.
 - 2. Installation of access doors supplied by mechanical and electrical trades.
 - 3. Types of construction in which access doors are installed include:
 - a. Gypsum board.
 - 4. Exact locations and sizes of access doors may not be indicated on the drawings. Obtain specific locations and sizes for access doors from trades requiring access to concealed equipment.
 - 5. Where access doors must be used in fire-rated assemblies, use units of rating required by applicable codes.
- B. Related Sections:
 - 1. Painting of access doors: Division 9.
 - 2. Access doors supplied by mechanical trades: Division 15.
 - 3. Access doors supplied by electrical trades: Division 16.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's descriptive information for each access door assembly type including installation instructions, finishes, anchorage accessories, and latching/locking provisions.

1.4 QUALITY ASSURANCE

- A. Fire Resistance:
 - 1. For fire-rated ceiling access doors, provide door assembly from manufacturer whose products have been tested by independent testing agency acceptable to the building official and have been found acceptable for fire ratings indicated.
 - a. Provide testing agency label on each fire-rated access door.

- B. Size Variations: Have architect approve manufacturer's standard access door sizes which are different than actual opening size necessary for access.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of access doors with other work to avoid delays.

1.6 SEQUENCING AND SCHEDULING

- A. Coordination: Supply access door anchors to be sequenced with other work to the respective trade for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Where products are named in the specifications, comparable products from other manufacturers will be considered for substitution. Comply with Division 1 requirements for substitutions.

2.2 MANUFACTURED UNITS

- A. Attic Access Door:
 1. Location: Ceiling, one in each building.
 2. Product/Manufacturer:
 - a. Karp Associates, "36 x 36".
 3. Substrate: Gypsum board.
 4. One Hour Fire Rated Door.

2.3 FABRICATION

- A. Access Doors and Frames:
 1. General: Fabricate access door components of continuous welded construction, with welds ground smooth.
 - a. Fabricate units of continuous welded steel construction.
 2. Frames:
 - a. Exposed frame: Fabricate frame with nominal 1-inch-wide exposed flange at door panel perimeter.
 - b. Concealed frames in gypsum board construction: Fabricate frame with perforated flanges and gypsum board finishing trim.

3. Doors:
 - a. Flush panel doors:
 - (1) Fabricate door panel from material and material gage indicated, with a smooth face, and with door edges installed square with door frame.
 - (2) Unit to be insulated flush doors, continuous piano hinge, and self-closing mechanism with interior side safety latch release in manufacturer's standard tested design for fire rating indicated for surrounding ceiling.
4. Provide weatherstripping that laps the joint between the door and frame.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install access doors in accordance with door manufacturer's instructions.
- B. Fasten access door assemblies securely in place with exposed surfaces located level and flush with substrate.

3.2 ADJUSTING

- A. Upon completion of installation, adjust door panels, hinges, and hardware to operate smoothly.
- B. Remove and replace damaged or warped doors or frames.

END OF SECTION 08305

SECTION 08364 - SECTIONAL OVERHEAD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Wood faced sectional overhead door and motor.
 - 2. Operation mechanisms.
 - 3. Locations for sectional overhead doors are indicated on the drawings.
- B. Related Sections:
 - 1. Electric service characteristics for motor operators: Division 16.

1.3 REFERENCES

- A. NAGDM 102-1988 -- Specifications for Sectional Overhead Type Doors; National Association of Garage Door Manufacturers; 1988.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Sectional overhead doors standard: Comply with NAGDM 102.

1.5 SUBMITTALS

- A. Product Data: Manufacturer's technical information and installation directions demonstrate that products comply with contract documents.
- B. Shop Drawings: Fully dimensioned and detailed drawings showing door elevation, complete installation with components, materials and finishes, and accessories indicated.
- C. Quality Control Submittals:
 - 1. Manufacturer's directions: Submit directions for installation and operation of door units; distribute a copy to installer before start of work.

- D. Contract Closeout Submittals:
 - 1. Operation and maintenance data: Door operation instructions and maintenance data for each door type.

1.6 WARRANTY

- A. Manufacturer's Product Warranty: Submit manufacturer's standard 5-year limited product warranty signed by the manufacturer's authorized official, guaranteeing to correct failures in product which may occur during the warranty period, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Comparable products from other manufacturers will be considered for substitution. Comply with Division 1 requirements for substitutions.

2.2 MANUFACTURED UNITS

- A. Steel Sectional Overhead Door:
 - 1. Product name/manufacturer:
 - a. Overhead Door, Inc: the Ranch House Collection Series 148 to match elevation on drawings.
 - 2. Steel door panels
 - 3. Wood face: A grade Redwood.
 - 4. Door finish: Stain finish specified under 09900.
 - 5. Glazing: Manufacturer's Standard Glazing.
 - 6. Decorative Hardware: (12) strap hinges #10.
 - 7. Insulation: 1 3/8" rigid foamed-in-place polyurethane.
 - 8. Counterbalancing mechanism: Torsion spring type.
 - 9. Rollers: Manufacturer's standard vinyl rollers.
 - 10. Electric operator: ZAP wall mounted motor.
 - a. Control station: Single push-button control station inside with remotes operation from vehicles.

2.3 COMPONENTS

A. Tracks:

1. Manufacturer's standard 3" galvanized steel tracks and accessories designed to accommodate door size, weight, and clearances indicated from adjacent construction. If headroom constraints do not permit 3" track provide 2" track.
2. Tilt tracks from vertical to achieve closure at jambs when sectional door is closed. Weld or bolt to track supports.
3. Accessories:
 - a. Provide brackets, anchors and reinforcing for rigid support and smooth operation of roller guides, for door type, weight and size.
 - b. Provide isolation connections for track supports to structure. Isolation connections shall not provide a metal to metal connection.

B. Counterbalancing Mechanisms:

1. Torsion spring:
 - a. Tempered steel torsion springs mounted on and secured to a hardened tubular steel shaft, with cable drums attached at each end of shaft.
 - b. Counterbalance supports: One ball-bearing bracket at each end of shaft and at midpoint, for shafts up to 16 feet long. Provide two additional brackets at third points to support shafts over 16 feet long.
 - c. Emergency door stop: Spring-loaded steel or bronze cam secured to bottom door rollers at each track.
 - d. Cushion door stop: Spring bumper attached at end of each horizontal track.

C. Electric Door Operators:

1. ZAP wall mounted motor.
2. Emergency disconnect: Provide mechanism to allow transfer to manual hand chain operation, with safety device to lock out use of motor when chain is in use.
3. Provide the number of remotes for the operation of the door for tenants and Owner equal to the number of units in the building plus five (5) additional remotes.

2.4 ACCESSORIES

A. Hardware:

1. Heavy duty hardware, made from noncorrosive metal and provided with noncorrosive fasteners, as required for door type.
2. Hinges:
 - a. Heavy steel hinges at each end and intermediate stile, of type recommended by manufacturer for size of overhead door.
 - b. Thru-bolt hinges to door sections at stiles and rails using lock washers and nuts, or rivets where access to nuts is not available.
3. Rollers:
 - a. Heavy duty ball-bearing rollers, in steel races. Mount rollers with projections from door surface as required to suit slope of track.
 - b. Roller tires: vinyl 3-inch diameter tires for 3-inch track, vinyl 2-inch diameter tires for 2-inch track; track size as recommended by door manufacturer for required door size.

B. Weather stripping:

1. Provide top quality weather stripping at all edges for an air tight seal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Examine openings to receive sectional overhead doors for conditions that will prohibit proper installation. Correct unacceptable conditions before start of installation.

3.2 PREPARATION

- A. Prepare surfaces at openings where sectional overhead doors will be installed in accordance with manufacturer's recommendations.

3.3 INSTALLATION

- A. Install complete overhead door assembly in compliance with manufacturer's instructions.
- B. Anchor vertical tracks to rough opening perimeter at minimum 24 inches on center.
- C. Horizontal Tracks: Support from overhead framing with welded or bolted steel angles or channels, including diagonal bracing as necessary for secure installation.

3.4 ADJUSTING

- A. After door installation is complete, examine door performance, test operation, and adjust installation to provide smooth and quiet operation.
- B. Adjust door operators for proper performance in accordance with manufacturer's instructions.

3.5 CLEANING

- A. Clean all door surfaces, tracks, springs, and operators, before final acceptance.

3.6 PROTECTION

- A. After installation and until final acceptance, protect door, equipment, and accessories from damage, and maintain in clean condition and operating properly.

END OF SECTION 08364

SECTION 08400 – ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 Summary

- A. Section Includes: Kawneer Architectural Aluminum Entrance and Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
 - 1. Types of Kawneer Aluminum Storefront Systems include:
 - a. Miscellaneous Framing Storefront System, 2" x 6" nominal dimension, with Glass Stop Assembly.
 - 2. Types of Kawneer Aluminum Entrances include:
 - a. 500 Swing Door; Wide stile, 5" (127) vertical face dimension, 1-3/4" (44.5) depth, high traffic applications.

1.3 System Description

- A. Storefront System Performance Requirements:
 - 1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures of 100 lbs./sq. ft. inward and. The design pressures are based on the International Building Code; 2003 Edition.
 - 2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft² (0.3 l/s · m²) at a static air pressure differential of 6.24 psf (300 Pa).
 - 3. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.

4. Uniform Load: A static air design load of 20 psf (958 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
5. Condensation Resistance (CRF): When tested to AAMA Specification 1503, the condensation resistance factor shall not be less than:
 - a. Glass to Exterior – 70_{frame} and 69_{glass} (low-e) or 69_{frame} and 58_{glass} (clear).
 - b. Glass to Center – 62_{frame} and 68_{glass} (low-e) or 63_{frame} and 56_{glass} (clear).
 - c. Glass to Interior – 56_{frame} and 67_{glass} (low-e) or 54_{frame} and 58_{glass} (clear).
6. Sound Transmission Class (STC) and Outdoor-Indoor Transmission Class (OITC): When tested to AAMA Specification 1801 and in accordance with ASTM E1425 and ASTM E90, the STC and OITC Rating shall not be less than:
 - a. Glass to Exterior – 38 (STC) and 31 (OITC)
 - b. Glass to Center – 37 (STC) and 30 (OITC)
 - c. Glass to Interior – 38 (STC) and 30 (OITC)

B. Entrance Performance Requirements:

1. Air Infiltration: For single acting offset pivot or butt hung entrances in the closed and locked position, the test specimen shall be tested in accordance with ASTM E 283 at a pressure differential of 6.24 psf (300 Pa) for single doors and 1.567 psf for pairs of doors. A single 3'0" x 7'0" (915 x 2134) entrance door and frame shall not exceed 0.50 cfm per square foot. A pair of 6'0" x 7'0" (1830 x 2134) entrance doors and frame shall not exceed 1.0 cfm per square foot.
2. Structural: Corner strength shall be tested per the Kawneer dual moment load test procedure and certified by an independent testing laboratory to ensure weld compliance and corner integrity [Testing procedure and certified test results available upon request].

1.4 Submittals

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."

B. Quality Assurance/Control Submittals:

1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics.

C. Shop drawings of all openings showing dimensions and proposed framing and doors.

1.5 Warranty

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Product Warranty: Submit, for Owner's acceptance, manufacturer's warranty for storefront system as follows:

1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by Kawneer. In addition, welded door corner construction shall be supported with a limited lifetime warranty for the life of the door under normal use.

1.6 Quality Assurance

A. Qualifications:

1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project and who is acceptable to product manufacturer.
2. Manufacturer Qualifications: Manufacturer capable of providing structural calculations, applicable independent product test reports, installation instructions, a review of the application method, customer approval and periodic field service representation during construction.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

1.7 Delivery, Storage, and Handling

A. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

- C. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

PART 2 - PRODUCTS

2.1 Manufacturer

- A. Acceptable Manufacturers: Kawneer Company, Inc.
 - 1. Product: Kawneer Aluminum Storefront Systems.
 - a. Kawneer Aluminum Storefront System.
 - b. Series: Miscellaneous Framing Storefront System.
 - c. Framing Member Profile: 2"x6" nominal dimension; Center Glazed (Type B); Provide the most economical connection system for the conditions from the manufacturer's standards as follows, Screw Spline, Shear Block, Stick or Punched Opening Fabrication.
 - d. Glass Stop Assembly: 027-368 Setting Block with 069-197 Face and 069-195 Gutter.
 - e. Insulated aluminum clad bottom panels.
 - f. Finish/Color: (See 2.06 Finishes)
 - g. Glazing: 1" Low E/Argon insulated double pane glass using Cross Rail muntins in the pattern shown on the drawings. See elevations.
 - h. Muntins: 5/16" Cross Rail with 1" Infill glazing stops.
 - 2. Product: Kawneer Aluminum Entrances.
 - a. Series: 500 Swing Doors
 - b. Vertical Stile and Top Rail: 5".
 - c. Bottom Rail: 7 1/2".
 - d. Cross Rail: 3 1/2".
 - e. Insulated aluminum clad bottom panel.
 - f. Finish/Color: (See 2.06 Finishes)
 - g. Glazing: 1/4" single pane glass using Cross Rail muntins for the pattern shown on the drawings. See elevations.
 - h. Muntins: 5/16" Cross Rail.
- B. Substitutions:
 - 1. General: Refer to Substitutions Section for procedures and submission requirements.
 - a. Substitutions: Submit written request in order to avoid storefront installation and construction delays.

2. Substitution Documentation
 - a. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
 - b. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefront for a period of not less than ten (10) years.
 - c. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
 - d. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.
3. Substitution Acceptance: Acceptance will be in written form on submitted material.

2.2 Materials

- A. Aluminum (Framing, Entrances and Components):
 1. Material Standard: ASTM B 221; 6063-T6 alloy and temper
 2. Member Wall Thickness: Each framing member shall provide structural strength to meet specified performance requirements.
 3. Major portions of the door members to be 0.125" (3.2) nominal in thickness and glazing molding to be 0.05" (1.3) thick.
 4. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront and entrance members are nominal and in compliance with AA Aluminum Standards and Data.
- B. Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
- C. Provide adjustable glass jacks to help center the glass in the door opening.

2.3 Accessories

- A. Fasteners: Where exposed, shall be aluminum, stainless steel or plated steel.
- B. Gaskets: Glazing gaskets shall be extruded EPDM rubber.
- C. Perimeter Anchors: Aluminum. When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

D. Standard Entrance Hardware

1. Weatherstripping:
 - a. Meeting stiles on pairs of doors shall be equipped with an adjustable astragal utilizing wool pile with polymeric fin.
 - b. The door weathering on a single acting offset pivot or butt hung door and frame (single or pairs) shall be Kawneer Sealair® weathering. This is comprised of a thermoplastic elastomer weathering on a tubular shape with a semi-rigid polymeric backing.
2. Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners (Necessary to meet specified performance tests).
3. Threshold: Extruded aluminum, one piece per door opening, with ribbed surface.
4. Butt Hinge: Kawneer Standard is Stainless Steel w/ Powder Coating & Non Removable Pin (NRP) (NOTE: EL Hinge available for access control)
5. Push/Pull: Style CO-9.
6. Exit Device: Panic Guard®.
7. The guard device of the Panic Guard exit system shall have a 1" x 1-3/4" retractable aluminum astragal bar with 1/2" (13) locking throw extending full height of the doors.
8. Closer: P&P LCN 2030/ No HO.
9. Security Lock/Dead Lock: Active Leaf.
10. Cylinder(s)/Thumbturn: See Hardware Specification 08710.

2.4 Related Materials

- A. Sealants: Refer to Joint Treatment (Sealants) Section.
- B. Glass: Refer to Glass and Glazing Section.

2.5 Fabrication

- A. General:
 1. Fabricate components per manufacturer's installation instructions and with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
 2. Accurately fit and secure joints and corners. Make joints flush, hairline and weatherproof.
 3. Prepare components to receive anchor devices. Fabricate anchors.
 4. Arrange fasteners and attachments to conceal from view.

B. Entrance System Fabrication:

1. Door corner construction shall consist of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8" (29) long fillet welds inside and outside of all four corners. Glazing stops shall be hook-in type with EPDM glazing gaskets reinforced with non-stretchable cord.
3. Prepare components with internal reinforcement for door hardware.

2.6 Finishes

A. Factory Finishing, provide one of the following finishes in a matching color to the selected window colors. Colors to be provided during the submittal process.

1. Fluropon® (70% PVDF), AAMA 2605, Fluoropolymer Coating.
2. Kawneer Permادize® (50% PVDF), AAMA 2604, Fluoropolymer Coating.
3. Interpon® D2000, AAMA 2604, Powder Coating.

2.7 Source Quality Control

A. Source Quality: Provide aluminum storefront specified herein from a single source.

1. Building Enclosure System: When aluminum storefront is part of a building enclosure system, including entrances, entrance hardware, windows, curtain wall system and related products, provide building enclosure system products from a single source manufacturer.

B. Fabrication Tolerances: Fabricate aluminum storefront in accordance with framing manufacturer's prescribed tolerances.

PART 3 - EXECUTION

3.1 Examination

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive storefront system and sill plate is level in accordance with manufacturer's acceptable tolerances.

1. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

3.2 Installation

- A. General: Install framing and entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual.
 - 1. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
 - 2. Dissimilar Materials: Provide separation of aluminum materials from sources of corrosion or electrolytic action contact points.
 - 3. Weathertight Construction: Install sill members and other members in a bed of sealant or with joint filler or gaskets, to provide weathertight construction. Coordinate installation with wall flashings and other components of construction.
 - 4. Provide alignment attachments and shims to permanently fasten system to building structure.
 - 5. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.
 - 6. Set thresholds in bed of mastic and secure.
 - 7. Adjusting: Adjust operating hardware for smooth operation.

- B. Related Products Installation Requirements:
 - 1. Sealants (Perimeter): Refer to Joint Treatment (Sealants) Section.
 - 2. Glass: Refer to Glass and Glazing Section.
 - a. Reference: ANSI Z97.1, CPSC 16 CFR 1201 and GANA Glazing Manual.

3.3 Field Quality Control

- A. Field Tests: Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
 - 1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements. Testing Standard per AAMA 503, including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 Water Infiltration Test.
 - a. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft², which ever is greater.

- b. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.24 psf (300 Pa).
- B. Manufacturer's Field Services: Upon Owner's written request, provide periodic site visit by manufacturer's field service representative.

3.4 Protection and Cleaning

- A. Protection: Protect installed product's finish surfaces from damage during construction. Protect aluminum storefront system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants. Remove and replace damaged aluminum entrances at no extra cost.
- B. Cleaning: Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

END OF SECTION 08400

SECTION 08615 - WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SECTION INCLUDES

- A. Shop fabricated aluminum clad windows and sliding glass doors with fixed and operating sashes; shop glazed. Double hung, awning, round and sliding glass doors.
- B. Shop fabricated wood double hung windows.
- C. Operating hardware and insect screens.
- D. PVC surrounds in Fiber Cement Board siding.

1.3 RELATED SECTIONS

- A. Section 06100 – Rough Carpentry.
- B. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.
- C. Section 09900 - Painting.

1.4 REFERENCES

- A. ASTM E283 - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
- B. ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- C. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- D. ANSI/NWWDA IS-2 - Wood Windows.
- E. ANSI/NWWDA IS-4 - Water Repellant Preservative Non-Pressure Treatment for Millwork.

- F. ASTM D1784 - Rigid Poly (Vinylchloride) (PVC) Compounds and Chlorinated Poly (Vinylchloride) (CPVC) Compounds.
- G. FS L-S-125B - Screening, Insect, Nonmetallic.
- H. FS RR-W-365A - Wire Fabric (Insect Screening).

1.5 SYSTEM DESCRIPTION

- A. Windows: Wood sections, shop fabricated, vision glass, related flashings, anchorage and attachment devices.

1.6 PERFORMANCE REQUIREMENTS

- A. Conform to performance requirements of ANSI/NWWDA IS-2, Class 60.
- B. Design and size components to withstand dead and live loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with applicable code.
- C. Limit member deflection to flexure limit of glass; with full recovery of glazing materials.
- D. System to accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.
- E. Limit air leakage through assembly to 0.10 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with ASTM E283.
- F. Vapor Seal with Interior Atmospheric Pressure of 1 inch sp, 72 degrees F, 40 Percent RH: No failure.
- G. Water Leakage: None, when measured in accordance with ASTM E331 with a test pressure difference of 2.86 lbf/sq ft.
- H. Maintain continuous air and vapor barrier throughout assembly, primarily in line with inside pane of glass and inner sheet of infill panel and heel bead of glazing compound.
- I. Drain water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system, to the exterior by a weep drainage network.

1.7 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work; installation requirements; and details.
- C. Product Data: Provide component dimensions, anchorage and fasteners, glass, internal drainage details.
- D. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.8 QUALITY ASSURANCE

- A. Perform Work in accordance with ANSI/NWWDA IS-2.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01600.
- B. Protect pre-finished surfaces with standard wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.10 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

1.11 WARRANTY

- A. Warranty: Provide 10 year warranty including coverage for delamination or separation of finish cladding from window member and glazing seal failure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Eagle Windows and Doors. Provide windows with "Coastal Package" for installation in a coastal situation.

2.2 MATERIALS

- A. Wood: Clear ponderosa pine species, clear preservative treated to ANSI/NWWDA IS-4 of type suitable for opaque interior finish.
- B. Fasteners: Galvanized steel.
- C. Window surrounds for windows without Radius Top in Fiber Cement Board Siding and Panels
 1. Manufacturer materials: AZEK or equal.
 2. Head Casing: PVC 5/4x8
 - a. Surrounds in Fiber Cement Siding only to have AZEK Ram Crown, AZM-6934 at top of head casing.
 3. Jamb Casing: PVC 5/4X4.
 4. Sill Casing: AZEK Historic Sill AZM-6930.
 5. Provide integral J-Track to receive siding.
 6. All corners mitred.
 7. Surround to be shop fabricated with welded or glued corners and trim.
 8. Provide nailing fin or trim clip for blind fastening.
 9. Shop paint with paint specified in section 09900.

2.3 WINDOWS

- A. Refer to the drawings for window models and locations.
- B. Double Hung windows to be E-Tilt Double Hung Windows.
- C. Transom windows to be same profile of window below it.

2.4 COMPONENTS

- A. Frames and sashes:
 1. Exterior Windows.
 - a. Exterior side: Aluminum clad wood frames.
 - b. interior side: Wood frames.
 2. Casing:
 - a. In Architectural Stone veneer provide Sill Nosing.

- B. Jamb Liners.
 - 1. Exterior windows: Vinyl jamb liners with painted aluminum inserts for the exterior side and wood veneer wrapped vinyl inserts on the interior side.
 - 2. Interior frames: Vinyl jamb liners with wood veneer wrapped vinyl inserts on both side.
 - 3. Color: beige.
- C. Muntins:
 - 1. Exterior Windows: MDL, 1 1/8" profiled aluminum Between-the-Glass-Grilles muntin bars with exterior and interior applied 1 1/8" exterior simulated divided light grill in pattern shown on drawings. Between the glass muntin to be white.
- D. Sills:
 - 1. Exterior Windows: Aluminum Clad 1-5/8 inch nominal thickness, metal clad, sloped for positive wash; fit under sash to project 1-1/2 inch beyond wall face; one piece full width of opening.
- E. Insect Screens: Half screens. FS RR-W-365, woven fiberglass mesh.
- F. Operable Sash Weather Stripping: Resilient PVC; permanently resilient, profiled to effect weather seal.
- G. Fasteners: Galvanized steel.
- H. Jamb Extensions: Factory-applied to match wall width the window is installed in.
- I. Provide window manufacturer's standard nailing flanges for installation of windows in wood construction.

2.5 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials:
 - 1. Glass in Exterior Lights: Eagle Maximizer Plus, Type Low E insulated glazing with Argon gas.
 - 2. Provide tempered glass in sliding glass doors, inswing doors, windows in stairs, windows above tubs, in windows within 12" from edge of door and in windows within 18" from finished floor or from exterior grade.

2.6 SEALANT MATERIALS

- A. Sealant and Backing Materials: Manufacturer's standard.

2.7 HARDWARE

- A. Manufacturer's Corrosion Resistant Hardware except stainless steel rollers for the sliding glass doors.

2.8 FABRICATION

- A. Fabricate framing, mullions and sash members with mortise and tenon joints. Glue joints to hairline fit, weather tight.
- B. Finger joints permitted if wood matches in color and grain texture.
- C. Form sills in one piece. Slope sills for wash.
- D. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- E. Assemble insect screens of rolled aluminum rectangular sections. Miter and reinforced frame corners. Fit mesh taut in frame into frame and secured. Fit frame with two spring loaded plastic pins.
- F. Double weatherstrip exterior operable units.
- G. Shop glaze window units.

2.9 FINISHES

- A. Exterior Surfaces: Aluminum Clad Finish AAMA 2604.
 - 1. Refer to Memo Exterior Colors for window colors selected from manufacturer's standard colors.
- B. Interior Surfaces: Manufacturer's standard white primer.
- C. Screens: Charcoal color.
- D. Screen Frames: Match finish on sash
- E. Operators
 - 1. Windows: White
 - 2. Sliding glass doors and inswing doors: Brushed chrome.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site opening conditions under provisions of Section 01039.
- B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.2 INSTALLATION

- A. Install window frames, glass and glazing and hardware in accordance with manufacturers instructions. Provide window flashing as indicated on drawings.
- B. Attach window frame to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent work.
- D. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- E. Coordinate attachment and seal of perimeter air and vapor barrier materials.

3.3 ADJUSTING

- A. Adjust work to comply with manufacturer's specifications.
- B. Adjust operating hardware for smooth operation.

3.4 CLEANING

- A. Clean work under provisions of 01700.
- B. Remove protective material from pre-finished surfaces.
- C. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

END OF SECTION

SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. All door hardware, except that to be furnished by the door manufacturer and that specified elsewhere.
 - 2. Furnish and deliver all finish hardware necessary for all doors, also hardware as specified herein and as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates and all other devices necessary for the proper application of the hardware.
- B. Related Sections:
 - 1. Steel Doors and Steel Frames: Elsewhere in Division 8.
 - 2. Standard Steel Doors and Wood Frames: Elsewhere in Division 8.
 - 3. Wood Doors: Elsewhere in Division 8.
 - 4. Hollow Core Flush Wood Doors: Elsewhere in Division 8.
 - 5. Division 6 Section " Finish Carpentry"
 - 6. Division 16 Section " Electrical"
- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets.
 - 1. Windows
 - 2. Cabinets of all kinds, including open wall shelving and locks.
 - 3. Signs, except as noted.
 - 4. Toilet accessories of all kinds including coat hooks.
 - 5. Overhead doors (except cylinders where scheduled).

1.3 REFERENCES

- A. BHMA A156.3-1989 -- American National Standard for Exit Devices; 1989.
- B. BHMA A156.7-1988 -- American National Standard for Template Hinge Dimensions; 1988.

- C. BHMA A156.12-1986 -- American National Standard for Interconnected Locks & Latches; 1986.
- D. BHMA A156.14-1991 -- American National Standard for Sliding and Folding Door Hardware; 1991.
- E. BHMA A156.16-1989 -- American National Standard for Auxiliary Hardware; 1989.
- F. BHMA A156.18-1987 -- American National Standard for Materials and Finishes; 1987.
- G. Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute (DHI); 1990.
- H. NFPA 80 -- Standard for Fire Doors and Windows; National Fire Protection Association; 1992 (with Errata dated October 6, 1992).
- I. Applicable state and local building codes.
- J. NFPA 101 – Life Safety Code
- K. NFPA 105 – Smoke and Draft Control Door Assemblies
- L. ICC (CABO)/ANSI A117.1 – Accessible and Usable Buildings and Facilities
- M. ADA – Americans with Disabilities Act
- N. DHI – Door and Hardware Institute, Sequence and Format for the Hardware Schedule
- O. Recommended Locations for Builders Hardware

1.4 SUBMITTALS

- A. Make the following submittals in the order indicated, unless submitted simultaneously.
- B. Supplier Qualifications: To the architect, for information.
- C. Product Data: Manufacturer's data for each different piece of hardware, with installation instructions.

- D. Hardware Schedule: Show manufacturer's complete identification for every item for every door.
 - 1. Cross-reference to item names and designations in contract documents.
 - 2. Indicate door/frame materials and sizes.
 - 3. Explain number codes and abbreviations.
 - 4. Indicate hardware mounting heights or locations, if different from those specified.
 - 5. Indicate finish for each item.
 - 6. Preliminary schedule will be reviewed if accompanied by product data.
- E. Operation and Maintenance Data: For operating parts and finishes.
- F. Catalog Cuts: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- G. Key Schedule: After a keying meeting between representatives of the Owner, Architect, hardware supplier, and, if requested, the representative for the lock manufacturer, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled.
- H. Samples: If requested by the Architect, submit samples of each type of exposed hardware unit in the finish indicated, and tagged with a full description for coordination with the schedule.
 - 1. Samples will be returned to the supplier in like-new condition. Units that are acceptable to the Architect may, after final check of operations, be incorporated into the Work, within limitations of key coordination requirements.
- I. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.
- J. Wiring Diagrams: After final approval of the hardware schedule, submit wiring diagrams as required for the proper installation of all electrical, electromechanical, and electromagnetic products.

1.5 QUALITY ASSURANCE

- A. Substitutions: Products are to be those specified to ensure a uniform basis of acceptable materials. Requests for substitutions must be made in accordance with Division 1 requirements. If proposing a substitute product, submit product data for the proposed item with product data for the specified item and indicate basis for substitution and savings to be made. Provide sample if requested. Certain products have been selected for their unique characteristics and particular project suitability.
 - 1. Items specified as "no substitution" shall be provided exactly as listed.
 - 2. Items listed with no substitute manufacturers listed have been requested by the Owner or Architect to match existing for continuity and/or future performance and maintenance standards or because there is no know equal product.
 - 3. If no other products are listed in a category, then "no substitution" is implied.
- B. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Supplier Qualifications: A recognized architectural hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an accredited Architectural Hardware Consultant (AHC), who is available to the Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.
- D. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.
- E. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwrites Laboratories, Intertek Testing Services, Factory Mutual, or other testing and inspecting organizations acceptable to the authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

- F. Provide permanent labels on all hardware except hinges, indicating the listing agency and conditions of the listing.
- G. Electronic Security Hardware: When electrified hardware is included in the hardware specification, the hardware supplier must employ an individual knowledgeable in electrified components and systems, who is capable of producing wiring diagrams and consulting as needed. Coordinate installation of the electronic security hardware with the Architect and electrical engineers and provide installation and technical data to the Architect and other related subcontractors. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

1.6 PROJECT CONDITIONS

- A. Sequence submittal of hardware schedule and door and frame submittals, allowing adequate time for review and resubmittal, if required, so that construction is not delayed; provide adequate information for review.
- B. Provide hardware installation templates to installers of hardware and to fabricators of other work which is required to be prepared in the shop or factory for hardware installation.
- C. Coordinate shop drawings of other work so that proper preparation is made.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hardware at the times and to the locations required for timely installation.
- B. Package each item separately or in container with items of same set only.
- C. Mark each item or package with hardware set number from hardware schedule.
- D. Provide a locked storage area controlled by the contractor for hardware not yet installed; take special care to prevent loss of long-lead items.

1.8 WARRANTY

- A. When warranties are required, verify with Owner's counsel that special warranties stated in this Article are not less than remedies available to Owner under prevailing local laws. Coordinate with Division 1 Section "Warranties."
- B. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- C. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or faulty operation of operators and door hardware.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- D. Provide manufacturer's warranties as follows:
 - 1. Locksets 3 years Grade 1 & 2, 1 year for Grade 3.
 - 2. Closers: 10 years, except electronic closers, 2 years.
 - 3. Exit Devices: 3 years, except electrified devices, 1 year.
 - 4. Hinges: Life of the building.
 - 5. Continuous Hinges: 10 years.
 - 6. All other hardware: 1 year.
- E. No liability is to be assumed where damage or faulty operation is due to improper installation, improper use, or abuse.
- F. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Approval of manufacturers other than those listed shall be in accordance with paragraph 1.5.

- B. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product or it will not be approved.

Item	Scheduled Manufacturer	Acceptable Substitute
Hinges	Hager	Stanley, Ives
Locksets & Deadlocks	Schlage (SCH)	Sargent, Yale
Cylinders & Keying	Schlage (SCH)	
Exit Devices & Mullions	Monarch	Von Duprin
Door Closers	Dorma, LCN	Dor-o-Matic
HC Door Operator	Von Duprin, LCN	
Push & Pull Plates & Bars	Hager	Ives, Rockwood
Flush Bolts & Coordinators	Rockwood	Hager, Ives
Protection Plates	Hager	Ives, Rockwood
Stops & Holders	Hager, Rockwood	Ives
Silencers	Ives	Hager, Rockwood
Thresholds & Weatherstrip	Hager	National Guard, Pemko, Reese
Key Cabinets	Telkee (TEL)	Lund, HPC

- C. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown. Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Architect's approval.

2.2 MATERIALS - GENERAL

- A. Manufacturer's Names and Trade Names: Display of names, logos, or other identification is acceptable on lock or hinge edge of door, but not where visible on either face of door.
 - 1. Exception: Required fire labels.
 - 2. Exception: As directed by or acceptable to the architect.
 - 3. Exception: Manufacturer's name or other identification on rim of lock cylinders.
- B. Fasteners: Provide hardware prepared by the manufacturer with fastener holes for machine screws, unless otherwise indicated.
 - 1. Provide all fasteners required for secure installation.
 - 2. Select fasteners appropriate to substrate and material being fastened.
 - 3. Use flathead Phillips screws unless otherwise indicated.
 - 4. Use wood screws for installation in wood.
 - 5. Use fasteners impervious to corrosion outdoors and on exterior doors.
 - 6. Exposed screws: Match hardware finish.
 - 7. For hardware exposed when door is closed, use concealed fasteners unless otherwise indicated, and unless stock units of the item specified are not available for installation with concealed fasteners.
 - 8. Where it is not possible to reinforce substrate adequately for screws, use through-bolts with sleeves or use sex bolts.
 - a. Do not use where head or nut would be exposed on face of door, unless specifically indicated or made necessary by other requirements.
 - b. Finish exposed heads and nuts the same as hardware on that side of the door.
- C. Finish on All Exposed Metal Items: 626 satin chrome, except 625 bright chrome for interior of toilet rooms and bathrooms.
 - 1. Hinges: Where steel hinges are acceptable, use matching plated finish.
 - 2. Items specified with the same finish shall match as closely as possible using standard manufactured products.

3. Provide finishes matching BHMA A156.18 designations.

2.3 HINGES

- A. Manufacturers:
 1. Butt hinges: Provide products complying with requirements of the contract documents and made by one of the following:
 - a. Hager Hinge Company.
 - b. Stanley Hardware Division/The Stanley Works.
- B. Butt Hinges: Hager Hardware.
 1. Hager Hardware.
 2. Products of other manufacturers listed above, provided they comply with requirements of the contract documents, will be considered.
 3. Dimensions: As indicated, within limits prescribed by ANSI/BHMA A156.7.
 - a. Size(s): 4 1/2 by 4 1/2 inches, except at inside unit doors which shall be 3 1/2 by 3 1/2 inches.
 - b. Exception: Where both leaves are to be installed into wood, template size units are not required.
 4. Hinge pins: Unless otherwise indicated:
 - a. Use steel pins for steel hinges.
 - b. Use stainless steel pins for nonferrous hinges.
 - c. Provide nonremovable pins or safety studs for out-swinging doors with keyed lock or exit only function.
 - d. Provide nonrising pins for interior doors.

2.4 LOCKS, LATCHES, AND BOLTS

- A. Manufacturers:
 1. Locksets and latchsets: Provide products complying with requirements of the contract documents and made by one of the following:
 - a. Schlage Lock Company.
 - b. Yale Security, Inc.
- B. Bored Locksets and Latchsets: "L Series", Schlage Lock Company; "ND Series", Schlage Lock Company; "D Series", Schlage Lock Company; "S Series", Schlage Lock Company; "F Series", Schlage Lock Company.
 1. Style: "07" for "L" Series; "Athens" for "D" Series; "Champagne" for "S" Series; "Champagne" for "F" Series.
 2. Products of other manufacturers, provided they comply with requirements of the contract documents, will be considered for substitution.

- C. Strikes: Provide strike for each latch bolt and lock bolt.
 - 1. Finish to match other hardware on door.
 - 2. Use wrought box strikes with curved lips unless otherwise indicated.
 - 3. Open strike plates may be used on interior wood door frames.
- D. Electric Strikes: Provide as noted in electrical specifications.
 - 1. Finish to match other hardware on door.
 - 2. Coordinate electrical requirements with electrical work.
- E. Cylinder Locks: Provide for exit devices. Coordinate with door manufacturer.

2.5 LOCK CYLINDERS

- A. Cylinders: Minimum 5-pin pin tumbler cylinders.
 - 1. Construction: All parts brass, bronze, nickel silver or stainless steel.
 - 2. Provide standard cylinders for locks on all doors, unless otherwise indicated.
 - 3. Construction keying: Provide for lock-out of construction keys without replacement of cylinders, by using a construction master key.
 - 4. Provide construction keying for locks on all exterior doors.

2.6 DOOR CONTROL DEVICES

- A. Surface-mounted closers: Provide products complying with requirements of the contract documents and made by one of the following:
 - 1. Dor-o-Matic Inc..
 - 2. Dorma Door Controls Inc.
 - 3. LCN.
 - 4. Sargent, Inc.
- B. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron or cast aluminum cylinder. Cylinder body shall be 1 1/2" in diameter, and double heat-treated pinion shall be 11/16" in diameter.
- C. Hydraulic fluid shall be of a type requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F. Fluid shall be fireproof and shall pass the requirements of the UL10C "positive pressure" fire test.

- D. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.
- E. All closers shall have solid forged steel main arms (and forged forearms for parallel arm closers).
- F. Closers shall not incorporate a pressure relief valve.
- G. Closer cylinders, and arms shall have a powder coating finish which has been certified to exceed 100 hours salt spray testing by an independent testing laboratory used by BHMA for ANSI certification. For metal components that can't be powder coated, a special rust inhibiting finish (SRI) must be used.
- H. Unless closer mounting is specifically identified in hardware sets, closers shall be mounted on the side of the door which is least exposed to public view.

2.7 HC DOOR OPERATOR

- A. Doors with lockset (Where shown and if shown on drawings):
 - 1. This door shall be operable in three ways. Like a standard door with a key and then turn lever to open the door, the strike released through the intercom and then turn lever to open the door or by activating the actuator with a key on the outside and a push plate on the inside and the door automatically opened. See the hardware schedule on the drawings for the related hardware. The items listed here encompass the HC Door Actuator for each door.
 - a. (1) Power supply: Von Duprin, PS873 X2 AO.
 - b. (1) Closer: LCN, 4631 STD, Brass finish.
 - c. (1) Wall Plate : LCN, 7910-956.
 - d. (1) Key switch (outside): Locknetics, 653-0405, 619 finish, w/ Schlage 20-061 cylinder.

2.8 BIFOLD DOOR HARDWARE

- A. Bifolding Doors: Provide manufacturer's standard overhead track package
 - 1. Comply with requirements of BHMA A156.14.
 - 2. Track: Extruded aluminum.
 - 3. Hinges: Adjustable pivots at jambs; butt hinges between leaves

4. Top guide: Wheeled trolley or nylon guide.
5. Door aligners.
6. Bumpers.
7. Wire Pulls: One for each side of bi-fold opening.
8. Wire Pulls: 1"x4" Bright Brass install horizontally.

2.9 LATCH PROTECTOR

- A. The latch protector width shall be sufficient to cover latch. Material shall be steel shop primed ready to be painted in the field.

2.10 EXIT DEVICES

- A. Exit devices shall be touchpad type, fabricated of brass, bronze, stainless steel, or aluminum, plated to the standard architectural finishes to match the balance of the door hardware.
- B. All exit devices shall incorporate a fluid damper or other device which eliminates noise associated with exit device operation. Touchpad shall extend a minimum of one half of the door width. End-cap will have two-point attachment to door. Touch-pad shall match exit device finish, and shall be stainless steel for US32D finish. Only compression springs will be used in devices, latches, and outside trims or controls.
- C. All devices to incorporate a security deadlatching feature.
- D. Provide roller strikes for all rim and surface mounted vertical rod devices, ASA strikes for mortise devices, and manufacturer's standard strikes for concealed vertical rod devices.
- E. Mechanism case shall sit flush on the face of all flush doors, or spacers shall be furnished to fill gaps behind devices. Where glass trim or molding projects off the face of the door, provide glass bead kits.
- F. All non-fire-rated exit devices shall have hex key dogging.
- G. Removable mullions shall be of aluminum tube construction. Where scheduled, mullion shall be of a type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
- H. Where lever handles are specified as outside trim for exit devices, provide heavy duty lever trims with forged or cast escutcheon plates. Where scheduled, provide vandal-resistant levers that will travel to a 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set. Lever style will match the lever style of the locksets.

- I. Exit devices shall be UL listed panic exit hardware. All exit devices for fire rated openings shall be UL labeled fire exit hardware.
- J. Provide electrical options as scheduled.
- K. Exit devices shall be successfully cycle-tested and certified for 1 million cycles by an independent testing laboratory.

2.11 PUSH PLATES

- A. Push Plates: 8" wide x 16" high x .050" thick. Where door stile does not allow 8" wide plates, 4" wide plates may be used.

2.12 DOOR PULLS AND PUSH BARS

- A. Door Pulls & Push Bars: Solid bar stock, diameter and length as scheduled. Push bars shall be of sufficient length to span from center to center of each stile.

2.13 PROTECTION PLATES

- A. Protection Plates: Provide kick, mop, or armor plates as scheduled, with 4 beveled edges. Furnish with machine or wood screws, finished to match plates. Sizes of plates shall be as follows:

2.14 DOOR STOPS AND HOLDERS

- A. It shall be the responsibility of the hardware supplier to provide door stops for all doors in accordance with the following requirements:
- B. Wall stops shall be used wherever possible.
- C. Where wall stops cannot be used, provide dome type floor stops of the proper height.
- D. At any opening where a wall or floor stop cannot be used, a heavy duty overhead stop must be used.
- E. Unit interior doors to have three hinge stops per door.

2.15 THRESHOLDS AND WEATHERSTRIP

- A. Thresholds: Aluminum HC accessible threshold sized to match depth of associated frame.

2.16 SILENCERS

- A. "Push-in" type silencers for each hollow metal or wood frame, 3 for each single frame, 2 for each pair frame. Omit where gasketing is scheduled.

2.17 ELECTRIC MAGNETIC HOLDERS

- A. Magnetic Holders: Provide wall- or floor-mounted electromagnetic door release with a minimum of 25 pounds of holding force, and a positive release button to initiate the closing motion. Projection of holder and armature must be coordinated with other hardware and wall conditions to ensure that door sits parallel to wall when fully open. Where magnetic holders are used on fire-rated doors, they must be wired into the fire control panel for fail-safe operation.

2.18 ELECTRIC MAGNETIC LOCKS

- A. Magnetic Lock: Provide frame mounted electromagnetic door lock. Electromagnetic door locks shall be released by a key switch for entry and then reset upon entry. Magnetic locks are used on egress doors, so they must be wired into the fire control panel for fail-safe operation. When fire alarm is activated door lock must release for normal operation of the door without a key.
 1. (1) Key switch (garage side): Locknetics, 653-0405, 619 finish, w/ Schlage 20-061 cylinder.

2.19 KEYING

- A. Key System: Schlage Everest patented keyway, non-interchangeable core typically with interchangeable core type operating cylinders for panic hardware. Key blanks available only from factory-direct sources, not available from after-market key blank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner to determine system keyway(s) and structure. Furnish Owner's written approval of the system.
 1. New factory registered master key system.
 2. Non-I.C. construction keying: inserted type partial key. At substantial completion, remove inserts in Owner's presence. Demonstrate consequent non-operability of construction key. Give all removed inserts and all construction keys to Owner.
 3. Furnish 10 construction keys.
 4. Furnish 2 construction control keys.
 5. Furnish 1 extractor tool 35-057.

6. Re-combinate entire project at no extra expense to Owner if missing any key.
- B. Locks and cylinders: keyed at factory of lock manufacturer where permanent records are maintained. Locks and cylinders same manufacturer.
- C. Permanent keys: secured shipment direct from point of origination to Owner.
- D. Bitting List: secured shipment direct from point of origination to Owner.
- E. Keying: Obtain the Owner's keying instructions.
 1. Key each lock as directed by the Owner.
 2. Provide 3 keys per lock, and a total of 6 master keys for each group.
 3. Provide 5 grandmaster keys.
 4. Extra blanks: 1 for each lock.

2.20 KEY CONTROL SYSTEM

- A. Provide a key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of the number of locks required for the Project.
 1. Provide complete cross index system set up by the hardware supplier, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
 2. Provide hinged-panel type cabinet for wall mounting.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Non-fire-rated wood doors and wood frames may be field-prepared for installation; all other types of doors and frames are to be factory- or shop-prepared.

3.2 INSTALLATION

- A. Follow hardware manufacturer's recommendations and instructions.
- B. Install surface-mounted items after substrates have been completely finished; install recessed items and recessed portions of items before finishes are applied and provide suitable, effective protection.

1. When surface-mounted items are installed before final finish, remove, store, and reinstall, or apply suitable effective protection.
 - C. Mount at heights specified in the Door and Hardware Institute's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 1. Exception(s):
 - a. As required by applicable regulations.
 - D. Install hardware in correct location, plumb and level.
 - E. Reinforce substrates as required for secure attachment and proper operation.
- 3.3 ADJUSTMENT
- A. Adjust each operable unit for correct function and smooth, free operation.
 - B. Adjust door closers to overcome air pressure produced by HVAC systems.
 - C. If hardware adjustment is completed more than one month before substantial completion, readjust hardware not more than one week before substantial completion.
- 3.4 INSTRUCTION OF OWNER'S PERSONNEL
- A. Instruct the owner's personnel in operation and maintenance of hardware, including finishes.
- 3.5 CLEANING
- A. Clean hardware; clean other work soiled during hardware installation.
- 3.6 CONTRACT CLOSEOUT
- A. Deliver all keys to the owner.
 - B. Deliver extra blanks to the owner.

END OF SECTION 08710

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Monolithic glass.
 - 2. Insulating glass.
 - 3. Glazing gaskets.
 - 4. Glazing sealants.
 - 5. Glazing accessories.
- B. Types of work in this section include work for:
 - 1. Exterior doors.
 - 2. Interior doors.
- C. Related Sections:
 - 1. Glazing for exterior doors: Elsewhere in Division 8.
 - 2. Glazing for interior doors: Elsewhere in Division 8.

1.3 REFERENCES

- A. AAMA 800-92 -- Voluntary Specifications and Test Methods for Sealants; American Architectural Manufacturers Association; 1992.
- B. ASTM C 509-93 -- Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material; 1993.
- C. ASTM C 834-91 -- Standard Specification for Latex Sealants; 1991.
- D. ASTM C 864-93 -- Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 1993.
- E. ASTM C 920-87 -- Standard Specification for Elastomeric Joint Sealants; 1987.

- F. ASTM C 1048-92 -- Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 1992.
- G. ASTM E 163-84 -- Standard Methods of Fire Tests of Window Assemblies; 1984.
- H. ASTM E 774-92 -- Standard Specification for Sealed Insulating Glass Units; 1992.
- I. Building Materials Directory; Underwriters Laboratories Inc. (UL); 1994.
- J. Glazing Manual; Flat Glass Marketing Association (FGMA); 1990.
- K. Sealant Manual; Flat Glass Marketing Association (FGMA); 1990.

1.4 PERFORMANCE REQUIREMENTS

- A. Exterior Glazing: Provide glazing assemblies which will withstand normal conditions without failure, loss of weathertightness, or deterioration.
 - 1. Design to accommodate thermal movement resulting from:
 - a. Air temperature range of 120 degrees F.
 - b. Material temperature range of 180 degrees F.
 - 2. Design to withstand wind loading as specified by applicable code for parts/portions of buildings.
 - a. Statistical probability of breakage: 8 per 1000, maximum, at 60-second wind load.
 - b. Failure includes loss or breakage of glass, due to wind load, exceeding that reasonably expected under the performance requirements specified.
- B. Deterioration includes:
 - 1. For insulating glass:
 - a. Moisture or dirt between panes.
 - b. Development of condensation between panes.
 - c. Damage to internal coating, if any.
 - d. Development of other visible indication of seal failure.
 - 2. For coated glass: Development of visible defects in coating.

1.5 SUBMITTALS

- A. Product Data: Manufacturer's data, describing product characteristics, installation instructions and recommendations, and maintenance procedures.

- B. Certification by contractor, installer, glass fabricator, or manufacturer that glass thickness and heat treatment have been selected to provide the strength required to meet specified structural performance requirements.
- C. Certificates for each product, from manufacturer stating that product used on the project complies with specified requirements.
- D. Insulating Unit Warranty.
- E. Weathertight Warranty.

1.6 QUALITY ASSURANCE

- A. Standard for Sealed Insulating Glass Units: ASTM E 774, with compliance certified by independent certification program.
 - 1. Label each unit permanently on spacer or on one pane.
 - 2. Certification agency:
 - a. Insulating Glass Certification Council (IGCC).
 - b. Associated Laboratories, Inc. (ALI).
 - c. Other agency acceptable to the architect.
- B. Standard for Fire-Resistance Rated Glass: ASTM E 163; each piece labeled by:
 - 1. Underwriters Laboratories Inc. (UL).
 - 2. Other agency acceptable to governing authorities.
- C. Certified Safety Glazing: Provide Category II products which comply with test requirements of 16 CFR 1201 and ANSI Z97.1 and permanently marked with label of:
 - 1. Safety Glazing Certification Council (SGCC).
 - 2. Other agency acceptable to governing authorities.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect products in accordance with manufacturer's recommendations; specifically, avoid damage to glass edges; prevent damage due to temperature changes, sunlight, and moisture.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions: Do not install glazing when either air or substrate temperature exceeds the range recommended by manufacturer or when substrate is wet, damp, or covered with snow, ice, or frost.

- B. Install bulk sealants only at air and substrate temperatures above 40 degrees F.

1.9 WARRANTY

- A. Submit a written warranty guaranteeing to correct failures in glazing which occur within the period indicated after substantial completion, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents.
 - 1. Warranty on insulating glass: 5 years.
 - 2. Weathertight warranty: Signed by installer and contractor, for 5 years. Failure is defined as water leakage through glazing assembly. Correction may include repair or replacement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Glass Manufacturers - General:
 - 1. Obtain materials from only one manufacturer or fabricator for each type; obtain tinted primary glass (if any) used for each type from only one manufacturer.
- B. Manufacturers:
 - 1. Insulating glass units: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. AFG Industries, Inc.
 - b. Cardinal IG Company.
 - c. Falconer-Lewistown, Inc.
 - d. Guardian Industries Corporation.
 - e. HGP Industries, Inc.
 - f. Inde-Pane, Inc.
 - g. Spectrum Glass Products, Inc.
 - h. Tempglass Division/Indal Ltd.
 - i. Viracon, Inc.

2. Primary float glass: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. AFG Industries, Inc.
 - b. Ford Glass Division/Ford Motor Company.
 - c. Guardian Industries Corporation.
 - d. Libbey-Owens-Ford Company.
 - e. Saint Gobain.

3. Heat-treated glass: Products of the following manufacturers, provided they comply with requirements of the contract documents, will be among those considered acceptable:
 - a. AFG Industries, Inc.
 - b. Guardian Industries Corporation.
 - c. HGP Industries, Inc.
 - d. Spectrum Glass Products, Inc.
 - e. Tempglass Division/Indal Ltd.
 - f. Viracon, Inc.

2.2 GLASS TYPES

- A. Glass Types - General: Provide glass types fabricated of the glass products indicated.
 1. Select products to comply with performance requirements indicated, in accordance with manufacturer's recommendations.
 2. Exterior glass thickness: 6 mm (1/4 inch nominal), minimum.
 3. Interior glass thickness: 6 millimeter (1/4 inch nominal), unless otherwise indicated.
 4. Heat treatment for exterior glass: As recommended by glass manufacturer to provide strength necessary to resist specified loads.
 - a. Exception: Safety glazing requirements supersede this strength requirement.
 5. Fabricate glass with bite and edge clearance dimensions, including tolerances, as recommended by manufacturer and FGMA "Glazing Manual."
 6. Cut tempered glass to size and shape and drill holes prior to tempering.

- B. Glass Type I - 1 : Sealed insulating units.
 - 1. Total thickness: 5/8 or 3/4 inch, coordinate with glass frame.
 - 2. Exterior pane: Low-emissivity coated glass.
 - a. Fully tempered float glass.
 - b. Color: Clear.
 - c. Coating: Pyrolytic deposition type.
 - 3. On second surface.
 - 4. Interior pane: Transparent float glass.
 - a. Fully tempered float glass.
 - b. Color: Clear.
 - 5. Acceptable glazing methods:
 - a. Compression gaskets, both sides.
 - 6. Between the glass muntins in configuration shown on drawings.
- C. Glass Type S - 1 : Fire-resistance rated glass.
 - 1. Product: Wire glass, 20 minute rated, 1/4" thick.
 - 2. Wire in glass to be horizontal and vertical.
 - 3. Acceptable glazing methods:
 - a. Sealant, both sides.
- D. Interior Glass : Single pane units.
 - 1. Total thickness: 1/4 inch, nominal.
 - 2. Pane: Transparent float glass.
 - a. Fully tempered float glass.
 - b. Color: Clear.
 - 3. Acceptable glazing methods:
 - a. Compression gaskets, both sides.

2.3 BASIC GLASS PRODUCTS

- A. Sealed Insulating Units: Factory-assembled multiple panes separated by and sealed to spacers forming air-tight, dehydrated air space(s).
 - 1. ASTM E 774, Class A.
 - 2. Spacer seals: Manufacturer's standard.
 - 3. Spacer corner construction: Manufacturer's standard.
 - 4. Drying agent: Manufacturer's standard.
- B. Float Glass: Quality q3, unless otherwise indicated.
 - 1. Heat-strengthened: ASTM C 1048, Kind HS, Type I.
 - 2. Fully tempered: ASTM C 1048, Kind FT, Type I.
 - a. Tong marks are not permitted on any piece.

2.4 INSTALLATION MATERIALS

- A. Installation Materials - General: Select products which have appropriate performance characteristics as recommended by glass and glazing materials manufacturers and which are compatible with all materials with which they will come into contact.
- B. Exterior Glazing Sealant: Solvent-release curing butyl or acrylic sealant, or silicone or urethane sealant complying with ASTM C 920.
 - 1. Demonstrate compatibility and adhesion by preconstruction testing.
 - 2. Colors: As selected by the architect from manufacturer's standard colors.
- C. Heel and Toe Bead Sealant: Noncuring, nonskinning, minimum 75 percent solids, butyl or polyisobutylene rubber, complying with 802.3, Type II ductile back bedding compound, as described in AAMA 800.
- D. Interior Glazing Sealant: One-part, nonsag, acrylic-latex emulsion sealant complying with ASTM C 834, paintable.
- E. Sealant Tape: Precured, 100 percent solids butyl polyisobutylene rubber with internal spacer rod or of composition limiting compression to a maximum of 50 percent, complying with 806.3 or 807.3 tape, as described in AAMA 800.
 - 1. Size tape so that it is under compression when glazing is fully installed.
- F. Dense Compression Gaskets: Preformed neoprene, EPDM, or thermoplastic polyolefin rubber, complying with ASTM C 864.
 - 1. Select style and size so that soft gasket will be compressed at least 25 percent when glazing is fully installed.
- G. Soft Compression Gaskets: Black, preformed closed-cell neoprene, complying with ASTM C 509, Type II; shape and density to maintain seal.
 - 1. Sealant tape may be used in lieu of soft gaskets, at contractor's option.
- H. Glazing Blocks: Neoprene, EPDM, or silicone.
 - 1. Setting blocks: 80 to 90 Shore A hardness.
 - 2. Spacers: As required to provide face and edge clearances recommended by FGMA "Glazing Manual," unless greater clearances are recommended by glazing manufacturer.

- I. Backer Rods: Flexible, nonabsorbent, compressible polyurethane foam, either open-cell or non-gassing closed-cell, unless otherwise restricted by sealant manufacturer; preformed to appropriate size and shape.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine frames and rabbets in which glazing is to be installed for conditions that could be detrimental to the longevity of the glazing. In particular, check for conditions that would void the manufacturer's warranty.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean surfaces to receive glazing just before installation of glazing.

3.3 INSTALLATION - GENERAL

- A. Comply with recommendations for installation contained in the FGMA "Glazing Manual" and "Sealant Manual" except when specifically not recommended or prohibited by the glass or glazing material manufacturer; comply with manufacturer's recommendations.
- B. Protect glazing from edge damage during handling and installation.
- C. Do not install glass that has edge damage or defects that reduce glass strength or performance or diminish appearance.
- D. Install glass so that visual characteristics, such as pattern, bow, and roll wave distortion, are uniform.

3.4 GLAZING IN FRAMES

- A. Use continuous heel or toe bead at all exterior glazing.
- B. Permanently adhere setting and edge blocks to frame.
- C. Do not block weep holes.
- D. Sealants:
 1. Remove applied coatings from surfaces, unless such coatings have been tested to show acceptable adhesion and compatibility.

2. Use continuous spacers.
 - a. Exception: For lights of less than 100 united inches, non-continuous spacers may be used, with backer rods to form proper sealant shape.
 3. Use primer where required for proper adhesion.
 4. Tool sealant, eliminating air pockets, with a definite slope away from glazing.
- E. Sealant Tape: Install tape continuously, located so that when compressed the exposed face will be flush with the face of the framing.
1. Do not use joints in tape, except at corners.
 2. Seal joints with compatible sealant.
- F. Compression Gaskets: Secure gaskets so they will not work out under normal movement.
1. Install so they fit tightly at corners, allowing for stretch during installation.
 2. Do not use joints in gaskets, except at corners.
 3. Miter-cut corners and seal joint with sealant.
 4. Install gaskets so they protrude slightly past face of framing.

3.5 PROTECTION AND CLEANING

- A. Do not apply tape or labels to glazing; remove temporary labels.
- B. Protect glazing during subsequent construction operations; remove dirt, contaminants, staining agents and other deposits promptly using manufacturer's recommended procedures.
 1. Clean off excess sealants as work progresses using methods which will not damage glazing.
- C. Replace glazing that is damaged.
- D. Wash both sides of glazing, using manufacturer's recommended procedures not more than 10 days before inspection for substantial completion.

END OF SECTION 08800

DIVISION 9

Finishes



SECTION 09260 - GYPSUM BOARD SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Gypsum board shaft liner.
 - 2. Gypsum wallboard.
 - 3. Drywall finishing.
 - 4. Cementitious Backer Board.
- B. Related Sections:
 - 1. Wood framing and furring: Division 6.
 - 2. Access doors: Division 8.
 - 3. Ceramic tile: Elsewhere in Division 9.
 - 4. Painting: Elsewhere in Division 9.

1.3 REFERENCES

- A. ASTM A 446/A 446M-93 -- Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality; 1993.
- B. ASTM A 641-94 -- Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 1994.
- C. ASTM A 792-93a -- Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process, General Requirements; 1993.
- D. ASTM C 36-93 -- Standard Specification for Gypsum Wallboard; 1993.
- E. ASTM C 475-93 -- Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 1993.
- F. ASTM C 514-94 -- Standard Specification for Nails for the Application of Gypsum Board; 1994.

- G. ASTM C 645-94 -- Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board; 1994.
- H. ASTM C 665-91 -- Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 1991.
- I. ASTM C 754-88 -- Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum; 1988.
- J. ASTM C 840-94 -- Standard Specification for Application and Finishing of Gypsum Board; 1994.
- K. ASTM C 919-84(88) -- Standard Practice for Use of Sealants in Acoustical Applications; 1984 (Reapproved 1988).
- L. ASTM C 1002-93 -- Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases; 1993.
- M. ASTM E 90-90 -- Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions; 1990.
- N. Fire Resistance Directory; Underwriters Laboratories Inc. (UL); 1994.
- O. GA-214-90 Recommended Specification: Level of Gypsum Board Finish; Gypsum Association; 1990.
- P. GA-216-93 -- Recommended Specifications for the Application and Finishing of Gypsum Board; Gypsum Association; 1993.
- Q. GA-219-89 Recommendations for Installation of Steel Fire Door Frames in Steel Stud-Gypsum Board Fire-Rated Partitions; Gypsum Association; 1989.
- R. Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute (AISI); 1986 (with 1989 Addendum and 1990 Errata).

1.4 SYSTEM DESCRIPTION

- A. General Performance Requirements, Gypsum Board Shaftwall: Provide pre-engineered system produced and distributed by a single manufacturer and tested for compliance with specified performance requirements.

- B. Sound-Rated Construction: Where indicated, provide construction built in accordance with manufacturer's assemblies which have been laboratory-tested per ASTM E 90 for designated STC ratings.
 - 1. STC rating for construction other than shaftwall: 50 minimum.

1.5 SUBMITTALS

- A. Refer to Assembly Schedule and provide submittals of all assemblies to be provided under this specification. Indicate all options within each assembly to be provided. For proprietary assemblies, if another manufacturer is to be provided, submit an equal assembly for the manufacturer selected. Mark assembly as a substitution for indicated assembly.
- B. Product Data: Submit manufacturer's product data for systems required, including installation instructions and data sufficient to show compliance with requirements.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Provide installation by a company specializing in work similar to that required on this project and with not less than 5 years of documented experience. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation. The individual shall have experience with multiple previous installations and competent to respond to concerns raised.
- B. Regulatory Requirements: At locations indicated on drawings, provide fire-rated assemblies tested in accordance with ASTM E 119 and acceptable to authorities for ratings required. Provide assemblies as listed in the following:
 - 1. Underwriters Laboratories Inc.'s (UL) "Fire Resistance Directory."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original and unopened packages, containers, or bundles, with brand names and manufacturer's labels intact and legible.
- B. Store materials in dry location, fully protected from weather and direct exposure to sunlight.
- C. Stack gypsum board products flat and level, properly supported to prevent sagging or damage to ends and edges.
- D. Store corner bead and other metal and plastic accessories to prevent bending, sagging, distortion, or other mechanical damage.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent. For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources. Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.
- B. Ventilation: Provide controlled ventilation during joint finishing operations, to eliminate excessive moisture. Avoid drafts during hot, dry weather to prevent finishing materials from drying too quickly.

PART 2 - PRODUCTS

2.1 FRAMING MATERIALS

- A. General: Select size and gage of framing members and establish spacing to comply with requirements of ASTM C 754 unless otherwise specifically indicated.
 - 1. Maximum deflection: $L/240$ at 5 lbf per square foot.
- B. Studs and Tracks: ASTM C 645, steel with protective coating.
 - 1. Nominal depths: As indicated on drawings.
- C. Furring Members: ASTM C 645, steel with protective coating.
 - 1. Where indicated as "resilient" or "acoustical," or where required for STC ratings indicated, provide manufacturer's special type designed for attachment by one flange for reduced sound transmission, RC-1.
 - 2. C-shaped studs, in locations indicated.
- D. Furring Fasteners/Connectors: Manufacturer's recommended system for specific application indicated, complying with ASTM C 754.

2.2 GYPSUM BOARD

- A. Manufacturers: Provide products complying with requirements of the contract documents and made by one of the following:
 - 1. Domtar Gypsum.
 - 2. Georgia-Pacific Corporation.
 - 3. Gold Bond Building Products, a National Gypsum Division.
 - 4. USG Corporation.

- B. Gypsum Wallboard: ASTM C 36; maximum lengths available to minimize end-to-end butt joints in each area receiving finished gypsum board.
 - 1. Fire-resistant type (Type X or equivalent), where required for fire-resistant rated assemblies.
 - 2. Edges: Tapered.
 - 3. Thickness: 5/8 inch and 1/2 inch, except as otherwise shown.

- C. Gypsum Moisture Resistant Wallboard (where shown and if shown): ASTM C 630 Water Resistant Gypsum Backing Board (+); maximum lengths available to minimize end-to-end butt joints in each area receiving finished gypsum board.
 - 1. Edges: Tapered.
 - 2. Thickness: 1/2 inch.

- D. Paperless Drywall Wallboard (where shown and if shown): ASTM D 3273 Mold Resistance; maximum lengths available to minimize end-to-end butt joints in each area receiving finished gypsum board.
 - 1. Manufacturer: G-P Gypsum, DensArmor Plus.
 - 2. Edges: Tapered.
 - 3. Thickness: 1/2 inch.

- E. Fire-Shield Shaftliner: a gypsum core wall panel with additives to enhance fire resistance of the core and surfaced with paper on front, back and long edges and complying with ASTM C 36 Type X
 - 1. Thickness: 1"
 - 2. Width: 2'
 - 3. Edges: Beveled.

- F. Exterior Gypsum Sheathing:
 - 1. DensGlass Gold.
 - 2. Thickness: 1/2 inch and 5/8" Type X.

2.3 MISCELLANEOUS WALLBOARD

- A. Wall Sheathing (In Shear Walls): ASTM C 208, Type IV, Grade 2 (Wall Sheathing: Structural).
 - 1. Thickness: 1/2"
 - 2. Each board shall have manufacturer's information and certification stamp.
 - 3. No substitutions.
- B. Sound Deadening Board (In Non Shear Walls):Fiber board manufactured as Sound Deadening Board.
 - 1. Thickness: 1/2"
- C. Cementitious Board:
 - 1. Gold Bond:
 - a. 1/2" PermaBase cement Board.
 - 2. James Hardie Building Products
 - a. Hardi Backer 500 1/2" Backer Board.
 - 3. USG Corporation.
 - a. 1/2" Durock Cement Board.

2.4 TRIM AND ACCESSORIES

- A. General: Except as otherwise specifically indicated, provide trim and accessories by manufacturer of gypsum board materials, made of galvanized steel or zinc alloy and configured for concealment in joint compound.
 - 1. Corner Bead: No-Coat Ultra Trim Outside 90.
 - 2. Control Joints: Trim-Tex; "Hideaway Expansion" 2708 or 2710.
 - 3. Inside and Outside Angle Corner Bead: No-Coat Ultraflex 325.
 - 4. Joint at drywall edge along round columns: Trim-Tex; "Pullaway L Bead" 3108 or 3110.
 - 5. Arched corners: No-Coat Ultra Arch Outside 90.
 - 6. Drywall Clips for Steel Beams:
 - a. Claw International: The Claw.
 - b. Wagner Associates, Inc.: Grabber CB60

2.5 JOINT TREATMENT

- A. General: Provide products by manufacturer of gypsum boards. Comply with ASTM C 475 and with manufacturer's recommendations for specific project conditions.
- B. Joint Tape: Manufacturer's standard mesh reinforcing tape only.

- C. Drying Type Joint Compound: Vinyl-based ready-mixed type for interior use, and as follows:
 - 1. All-purpose type, for both embedding tape and as topping.
- D. Setting-Type Joint Compound for laminate compound:
 - 1. USG Durabond 20 or 45 minute.

2.6 MISCELLANEOUS MATERIALS

- A. General: Provide miscellaneous materials as produced or recommended by manufacturer of gypsum products.
- B. Screws: ASTM C 1002; self-drilling type; lengths as recommended by gypsum board manufacturer for project conditions.
- C. Nails: ASTM C 514; lengths as recommended by manufacturer of gypsum board for project conditions.
 - 1. Fire-rated assemblies: Provide nails of exact length and diameter specified for rated assemblies.
- D. Laminating compound: Drywall manufacturer's standard quickset drywall compound. 30 minute setting time.
- E. Acoustical Sealants: ASTM C 919; nondrying, nonhardening, nonskinning type for concealed locations; nonoxidizing, skinning type for exposed locations.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspection: Verify that project conditions and substrates are appropriate to begin installation of work of this section.

3.2 INSTALLATION OF METAL FRAMING

- A. General: Comply with provisions of ASTM C 754 and ASTM C 840 requirements that apply to framing installation except where exceeded by other requirements.
- B. Suspended Drywall Ceilings and Soffits:
 - 1. Secure furring members by means of screws, clips, or wire ties, as appropriate to substrate. Space furring members as follows:
 - a. As indicated on drawings.

2. Level ceiling system to a tolerance of 1/8 inch in 12 feet, as measured both lengthwise on each member and transversely between parallel members.
3. Level soffits to a tolerance of 1/8 inch in 12 feet, as measured both lengthwise on each member and transversely between parallel members.
4. Reinforce openings and interruptions in horizontal framing system with additional furring channels.
5. Ensure that entire suspension system is laterally braced.

C. Steel Studs:

1. General: Install tracks and studs in accordance with manufacturer's recommendations and as follows:
 - a. Stud spacing: As indicated on drawings.
2. Door openings: Comply with recommendations of USG Corporation's "Gypsum Construction Handbook"; reinforce openings as required for size and weight of doors.
 - a. At openings in fire-rated partitions, comply with requirements of governing authorities for framing.
3. Partition heights: Extend studs to suspended ceiling height or to underside of floor or roof construction above, as indicated for specific locations on the drawings.
4. Partial height partitions: Extend studs to height indicated, bracing as required to assure stability.
5. Blocking and bracing: Install blocking and bracing as recommended by manufacturer for adequate support of wall-mounted items installed as work of other sections.

3.3 INSTALLATION OF GYPSUM BOARD

- A. General: Comply with ASTM C 840 and GA-216 except where exceeded by other requirements.
1. Wherever possible, install gypsum board to minimize butt end joints.
 2. Apply ceiling boards prior to installation of wallboards. Arrange to minimize butt end joints near center of ceiling area.
 3. Install wallboards in a manner which will minimize butt end joints in center of wall area. Stagger vertical joints on opposite sides of walls.
 4. Butt all joints loosely, with maximum of 1/16 inch between boards.
 5. Place wrapped edges adjacent to one another; do not place cut edges or butt ends adjacent to wrapped edges.
 6. Support all edges and ends of each board on framing or by solid substrate, except that long edges at right angles to framing members in non-fire-rated construction may be left unsupported.
 7. In double-layer ceiling work, apply layers as required by design rating.

8. In double-layer wall applications, apply layers as required by design rating.
- B. Control Joints: Form control joints by means of 1/4-inch space between adjacent gypsum boards, with each edge supported on separate framing member, ready to receive trim accessory, and located in the corridors and as follows:
1. Not more than 30 feet apart where walls are not intersected by other walls for 50 feet or more.
 2. In corridors with acoustical tile ceilings the control joint shall be located at the nearest upper corner of a door frame. It shall run up the wall across the ceiling and down the opposite wall.
 3. In corridors with drywall ceilings the control joints shall be located between doors. The joint shall run up the walls and across the ceiling.
- C. Sound-Rated Construction: Seal perimeter of construction with acoustical sealant, complying with ASTM C 919. Carefully seal around penetrations and at control joints and other openings.
1. At partitions shown or where required for STC ratings indicated, install sound attenuation blankets after gypsum board has been installed on one side.
- D. Installation on Wood Framing:
1. Single-layer application: Install gypsum board by the following method:
 - a. Screw attachment.
 2. Double-layer application:
 - a. Install base layer by means of screw attachment.
 - b. Install face layer by means of screw attachment.
 3. For fire-rated construction, install gypsum board in accordance with methods prescribed for the tested assembly.
- E. Installation on Metal Framing and Furring:
1. Single-layer application: Install gypsum board by means of screw attachment.
 - a. On walls and partitions, plan installation so that leading edge or end of gypsum board is attached to open end of stud flange first.
 2. For fire-rated construction, install gypsum board by means of screws as specified for the tested assembly.
- F. Installation of Moisture Resistant Drywall:
1. Install MR Drywall over fire rated drywall assembled where shown.
 2. Install fire rated drywall behind all tub and shower surrounds at fire rated walls.

- G. Installation of UL U525 assembly:
 - 1. Obtain National Gypsums installation instructions for this assembly to be installed to stud wall framing. In no case shall the quick set drywall compound be deleted.
 - 2. The following note to be provided in addition to the National Gypsum installation instructions: The vertical joints of the 1/2" Type X Drywall shall land on the studs. The joints of the inner 1/2" layer shall stagger with the 1/2" top layer. In order to stagger the joints of the 1" Shaftliner with the 1/2" layers the Shaftliner joints shall land half way between the studs. The Shaftliner is then screwed along the middle of the board to the stud it lines up with and any horizontal plates. Use grabber laminate screws along the joints of the shaftliner.

3.4 INSTALLATION OF TRIM AND ACCESSORIES

- A. General: Comply with manufacturer's recommendations for installation of trim items.
- B. Corner Bead: Install corner bead at all external corners.
- C. Edge Trim: Install edge trim at locations indicated and wherever edge of gypsum board otherwise would be exposed.
- D. Control Joints: Install one-piece control joints at required locations. Do not remove tape until finishing operations are complete.

3.5 FINISHING

- A. General: Comply with ASTM C 840 and GA-216 except where exceeded by other requirements.
 - 1. Do not mix joint compounds except as specifically recommended by manufacturer.
 - 2. For random rolled textured ceiling thin joint compound with water to allow for spay application.
- B. Finish gypsum board in accordance with the following level of finish per GA-214, except where indicated otherwise on the drawings:
 - 1. Level 3 at all walls and ceilings to be painted: Embed tape in joint compound at all joints and interior angles. Provide two separate coats of compound at all joints, angles, fastener heads, and accessories. Provide smooth surfaces free of tool marks and ridges.

- C. Joint Treatment: Tape and finish joints in accordance with manufacturer's instructions for compounds used, using proper hand tools designed for the purpose.
 - 1. Avoid raising nap of face paper when sanding; carefully sponge down any areas roughened by sanding process.
- D. Penetrations: Fill cutouts and openings around fixtures and penetrations with joint compound.

3.6 CLEANING

- A. Promptly remove any residual gypsum drywall materials from adjacent or adjoining surfaces, leaving spaces ready for subsequent finishing operations and decorating.

END OF SECTION 09260

SECTION 09313 – WALL AND FLOOR TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Wall and floor tile.
- B. Related Sections:
 - 1. Joint Sealers: Division 7.
 - 2. Gypsum Board Systems: Division 9.

1.3 REFERENCES

- A. ANSI A108.5-1985 -- Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1985.
- B. ANSI A108.10-1985 -- Installation of Grout in Tilework; 1985.
- C. ANSI A108.11-1990 -- American National Standard for Interior Installation of Cementitious Backer Units; 1990.
- D. ANSI A118.4-1985 -- American National Standard Specifications for Latex-Portland Cement Mortar; 1985.
- E. ANSI A118.6-1985 -- American National Standard Specifications for Ceramic Tile Grouts; 1985.
- F. ANSI A118.9-1990 -- American National Standard for Test Methods and Specifications for Cementitious Backer Units; 1990.
- G. ASTM C 920-87 -- Standard Specification for Elastomeric Joint Sealants; 1987.
- H. Handbook for Ceramic Tile Installation; Tile Council of America, Inc. (TCA) 1992.

1.4 SUBMITTALS

- A. Product Data: Written product information which demonstrates materials to be used on the project comply with contract documents.
- B. Samples - Initial Selection: Manufacturer's color selection boards of actual tile materials including a complete selection of available tile colors and finishes for each tile type indicated. Include samples of accessory materials requiring color selection.
- C. Qualifications Documentation: Written confirmation that companies executing work in this section comply with experience requirements.

1.5 QUALITY ASSURANCE

- A. Material Source: Furnish each type, finish, and color of tile product and accessory materials from a single supplier.
- B. Installer: A company with not less than 10 installations of tile work similar in size and complexity to the work of this project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store tile products and setting materials in manufacturer's sealed packages. Protect material from damage and store in dry location.

1.7 PROJECT CONDITIONS

- A. Provide temperatures in tiled areas during installation and after completion as required by referenced installation standard or manufacturer's instructions, but not less than 50 degrees F.
- B. If necessary to use temporary heaters, vent units to exterior to protect tile work from carbon dioxide accumulation.

1.8 MAINTENANCE

- A. Extra Materials: None

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

- A. Materials to be provided by manufacturer's listed.
- B. Tile Installation Materials Standard: ANSI standard referenced for setting and grouting materials.
- C. Colors, Textures, and Patterns, Tile, Grout, and Other Products: Colors as selected by the architect from manufacturer's standards.
- D. Color Blending: Factory-blend tile products which have a natural color range so products taken from one box will have the same range as products from a separate box.

2.2 TILE PRODUCTS

- A. Ceramic Tile:
 - 1. Ceramic Floor tile:
 - a. Daltile; Porcelain.
 - b. Color: White
 - c. Finish: Matte
 - d. Floor Field Size: 2" Octagon & 1" Dot.
 - 2. Ceramic Tub Surround Wall Tile:
 - a. Subway; Iron Gate.
 - b. Color: white.
 - c. Finish: Gloss.
 - d. Size: 3"x6".
 - 3. Master Bath Ceramic Shower Floor Tile:
 - a. American Olean; A13.
 - b. Color: white.
 - c. Finish: Unglazed matte.
 - d. Size: 1"x1".
- B. Marble Tile:
 - 1. The design is based on the following product:
 - a. Carrara Marble, Bianco. Submit samples for approval.
(1) Supplier: Shep Brown Associates. Woburn, MA.
 - b. Master Bathroom Floor Tile: 12x12 honed finish.
 - c. Master Bathroom Base: 4x12 honed finish, bull nose.
 - d. Master Bath Shower walls: 12x12 polished finish.
 - e. Master Bath Wall cap, shower threshold, shower seat and soap dish: 3/4" slab cut to fit or as shown on drawings, honed finish.

- C. Door Threshold:
 - 1. The design is based on the following product:
 - a. Venatino Marble, Bianco. Submit samples for approval.
(1) Supplier: Shep Brown Associates. Woburn, MA.

2.3 SETTING MATERIALS

- A. Ceramic Tile Adhesive: Provide Pro Spec Multipurpose Thin Set Mortar.
- B. Marble Tile Adhesive: Provide marble thin set white adhesive recommended by underlayment manufacturer for marble tile installation. Grey adhesive is not permitted.

2.4 GROUTING MATERIALS

- A. Grout: Pro Spec Grout or equal.

2.5 ELASTOMERIC SEALANTS

- A. Compatibility: Provide sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates for project performance conditions. Refer to Section 07900.
- B. Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and O (for nonporous substrates) with added fungicide.
 - 1. Manufacturers: Provide products complying with requirements of the contract documents.

2.6 MISCELLANEOUS MATERIALS

- A. Cementitious Backer Units, provide products complying with requirements of the contract documents and made by one of the following:
 - 1. Gold Bond:
 - a. 1/2" PermaBase cement Board.
 - 2. James Hardie Building Products
 - a. Hardi Backer 500 1/2" Backer Board.
 - 3. USG Corporation.
 - a. 1/2" Durock Cement Board.
- B. Floor Leveling or Sloping Underlayment: Portland based leveling underlayment permitted to be installed to a feathered, thin edge.
- C. Shower Waterproofing Membrane: Laticrete 9235 Waterproofing Membrane: Laticrete International, Inc.

- D. Tile Cleaner: Product specifically acceptable to tile manufacturer and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation or Ceramic Tile Institute.

2.7 MIXING MORTAR AND GROUT

- A. Mix mortar and grout to comply with referenced standards and manufacturer's mixing procedures.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify with the installer that substrate areas where tile is to be installed have been prepared correctly, and that all backing materials have been installed. Correct unacceptable conditions before start of tile work.

3.2 PREPARATION

- A. Install Pro Spec cork underlayment under floor tile except for showers following manufacturer's installation instructions and recommendations.
- B. Install Laticrete Waterproofing membrane over floor and 4' up walls behind shower tile enclosure following manufacturer's installation instructions.
- C. Factory-Blending: Before start of installation verify that tile with an anticipated range of colors has been correctly blended to achieve a uniform color range from tile package to tile package.
- D. Review installation in model unit of Carrara Marble and match installation method used there.

3.3 INSTALLATION - GENERAL

- A. Tile Installation Standard: ANSI A108 series, for setting and grouting materials listed.
- B. Installation Methods: Comply with TCA "Handbook for Ceramic Tile Installation" for type of applications indicated.
- C. Install tile under or behind equipment and fixtures.
- D. Carefully cut, drill, and grind tile to fit around items projecting through tile surface, so that escutcheons or cover plates conceal cut edges.

- E. Joint Patterns: Lay out tile according to patterns indicated on drawings, or if not shown, in a grid pattern with floor joints aligning with wall and trim joints. Install joints straight and of uniform width.
- F. Sealant-Filled Joints: Install expansion, control, and isolation joints where indicated on drawings. Saw-cut joints are unacceptable.
 - 1. Expansion joint installation method: TCA EJ 171.
- G. Grout Installation Standards:
 - 1. Ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement): ANSI A108.10.
 - 2. Follow manufacturer's installation instructions.
- H. Cementitious Backer Units: Install in accordance with ANSI A108.11.

3.4 TILE APPLICATIONS

- A. Interior Floor, Thin-Bed:
 - 1. Installation method:
 - a. Portland Based Leveling Underlayment as required.
 - b. Bond coat: Latex-portland cement mortar, ANSI A108.5.
 - 2. Grout: Dry-set portland cement.

3.5 CLEANING AND PROTECTION

- A. Clean tile surfaces after installation is complete.
- B. Replace any broken, chipped, marred, or otherwise damaged tile before final acceptance.
- C. Protection: Apply neutral protective cleaner to tile after installation if recommended by tile manufacturer. Overlay completed tile installation with kraft paper for protection from subsequent construction activities.
 - 1. Remove protection, rinse, and dry tile installations before final review and acceptance.

END OF SECTION 09313

SECTION 09330 - QUARRY TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Unglazed quarry tile.
- B. Related Sections:
 - 1. Concrete subbase: Division 3.
 - 2. Floor mats and frames: Division 12.

1.3 REFERENCES

- A. ANSI A108.4-1985 -- Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive; 1985.
- B. ANSI A108.10-1985 -- Installation of Grout in Tilework; 1985.
- C. ANSI A118.3-1985 -- American National Standard Specifications for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive; 1985.
- D. ANSI A118.6-1985 -- American National Standard Specifications for Ceramic Tile Grouts; 1985.
- E. Handbook for Ceramic Tile Installation; Tile Council of America, Inc. (TCA) 1992.

1.4 SUBMITTALS

- A. Product Data: Written product information which demonstrates materials to be used on the project comply with contract documents.
- B. Samples - Initial Selection: Manufacturer's color selection boards of actual tile materials including a complete selection of available tile colors and finishes for each tile type indicated. Include samples of accessory materials requiring color selection.

- C. Qualifications Documentation: Written confirmation that companies executing work in this section comply with experience requirements.

1.5 QUALITY ASSURANCE

- A. Material Source: Furnish each type, finish, and color of tile product and accessory materials from a single supplier.
- B. Installer: A company with not less than 10 installations of tile work similar in size and complexity to the work of this project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store tile products and setting materials in manufacturer's sealed packages. Protect material from damage and store in dry location.

1.7 PROJECT CONDITIONS

- A. Provide temperatures in tiled areas during installation and after completion as required by referenced installation standard or manufacturer's instructions, but not less than 50 degrees F.
- B. If necessary to use temporary heaters, vent units to exterior to protect tile work from carbon dioxide accumulation.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

- A. Tile Installation Materials Standard: ANSI standard referenced for setting and grouting materials.
- B. Colors, Textures, and Patterns, Tile, Grout, and Other Products: Match colors indicated or as selected by the architect from manufacturer's standards.
 - 1. Tile trim and accessories: Match color and finish of adjoining flat tile.
- C. Color Blending: Factory-blend tile products which have a natural color range so products taken from one box will have the same range as products from a separate box.

2.2 TILE PRODUCTS

- A. Unglazed Quarry Tile: Square-edged flat tile:
 - 1. The design is based on the following product:
 - a. Tile:
 - (1) Manufacturer: Daltile, Quarry Textures.
 - (2) Size: 6 inches by 6 inches by 3/8 inch.
 - b. Comparable products of other manufacturers will be considered for substitution.
 - 2. Trim units: Match color and finish of adjacent flat tile:
 - a. Shapes and sizes: Manufacturer's standard, as indicated, coordinated with size and coursing of adjacent flat tile, where applicable:
 - 3. Cove base, 5 inch by 6 inch.

2.3 SETTING MATERIALS

- A. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3.

2.4 GROUTING MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10.

2.5 MISCELLANEOUS MATERIALS

- A. Tile Cleaner: Product specifically acceptable to tile manufacturer and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation or Ceramic Tile Institute.

2.6 MIXING MORTAR AND GROUT

- A. Mix mortar and grout to comply with referenced standards and manufacturer's mixing procedures.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify with the installer that substrate areas where tile is to be installed have been prepared correctly, and that all backing materials have been installed. Correct unacceptable conditions before start of tile work.

3.2 PREPARATION

- A. Factory-Blending: Before start of installation verify that tile with an anticipated range of colors has been correctly blended to achieve a uniform color range from tile package to tile package.

3.3 INSTALLATION - GENERAL

- A. Tile Installation Standard: ANSI A108 series, for setting and grouting materials listed.
- B. Installation Methods: Comply with TCA "Handbook for Ceramic Tile Installation" for type of applications indicated.
- C. Install tile under or behind equipment and fixtures.
- D. Carefully cut, drill, and grind tile to fit around items projecting through tile surface, so that escutcheons or cover plates conceal cut edges.
- E. Joint Patterns: Lay out tile according to patterns indicated on drawings, or if not shown, in a grid pattern with floor joints aligning with wall and trim joints. Install joints straight and of uniform width.
- F. Sealant-Filled Joints: Install expansion, control, and isolation joints where indicated on drawings. Saw-cut joints are unacceptable.
 - 1. Expansion joint installation method: TCA EJ 171.
- G. Grout Installation Standards:
 - 1. Ceramic tile grouts (sand-portland cement, dry-set, commercial portland cement, and latex-portland cement): ANSI A108.10.

3.4 TILE APPLICATIONS

- A. Interior Floor, Thin-Bed:
 - 1. Installation method:
 - a. Concrete subfloor: TCA F116.
 - b. Bond coat: Epoxy adhesive, ANSI A108.4.
 - 2. Grout: Sand-portland cement.

3.5 CLEANING AND PROTECTION

- A. Clean tile surfaces after installation is complete.
 - 1. Only clean unglazed tile with acid solutions when recommended by the tile manufacturer. If acid solution is an acceptable cleaner, wait minimum 14 days after installation to clean tile. Protect materials other than tile from the acid solution during cleaning process.
- B. Replace any broken, chipped, marred, or otherwise damaged tile before final acceptance.
- C. Protection: Apply neutral protective cleaner to tile after installation if recommended by tile manufacturer. Overlay completed tile installation with kraft paper for protection from subsequent construction activities.
 - 1. Do not allow any traffic on completed tile floors for minimum 7 days after completion.
 - 2. Remove protection, rinse, and dry tile installations before final review and acceptance.

END OF SECTION 09330

SECTION 09511 – SUSPENDED CEILING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exposed suspension system.
 - 2. Trim and accessories.
 - 3. Acoustical lay-in panels.
 - 4. Drywall lay-in panels
- B. Related Sections:
 - 1. Gypsum board systems: Elsewhere in Division 9.
 - 2. Heating and ventilating: Division 15.
 - 3. Fire suppression systems: Division 15.
 - 4. Lighting: Division 16.

1.3 REFERENCES

- A. ASTM A 641-92 -- Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 1992.
- B. ASTM C 635-91 -- Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 1991.
- C. ASTM C 636-91 -- Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 1991.
- D. ASTM E 84-91a -- Standard Test Method for Surface Burning Characteristics of Building Materials; 1991.
- E. ASTM E 1264-90 -- Standard Classification for Acoustical Ceiling Products; 1990.

1.4 SUBMITTALS

- A. Refer to Assembly Schedule and provide submittals of all assemblies to be provided under this specification. Indicate all options within each assembly to be provided. For proprietary assemblies, if another manufacturer is to be provided, submit an equal assembly for the manufacturer selected. Mark assembly as a substitution for indicated assembly.
- B. Product Data: Submit data for each distinct suspension system and acoustical unit type indicated.
- C. Samples: Submit the following:
 - 1. Selection samples:
 - a. Acoustical units: Minimum 6-inch-square samples of acoustical units meeting the requirements of the specification for each type specified.
 - b. Exposed suspension and trim elements: Manufacturer's standard color and texture selection samples of finishes, on minimum 6-inch-long pieces of specified substrate.

1.5 QUALITY ASSURANCE

- A. Fire Performance Characteristics:
 - 1. Surface burning characteristics: Provide products having the following characteristics when tested in accordance with ASTM E 84:
 - a. Maximum flame spread: 25.
 - b. Maximum smoke developed: 50.

1.6 PROJECT CONDITIONS

- A. Coordination Data: Prepare and distribute to affected installers, data necessary for coordination with related work. Include setting diagrams showing placement of attachment devices for acoustical ceiling hangers.
- B. Coordinate ceiling system installation with work of other sections as required, including the following:
 - 1. Light fixtures.
 - 2. HVAC equipment.
 - 3. Fire suppression system components.
 - 4. Smoke detection system.

- C. Within each space to receive specified products, do not begin installation until the following conditions are met:
 - 1. Work above ceilings has been finished, tested, and approved.
 - 2. Space to receive ceiling system is properly enclosed and protected from weather.
 - 3. Any wet work within the space is dry.
- D. Do not begin installation of ceiling system until building's normal operating temperature and humidity levels have been reached and will be maintained.

1.7 MAINTENANCE

- A. Extra Materials: None.

PART 2 - PRODUCTS

2.1 ACOUSTICAL CEILING UNITS - GENERAL

- A. Standard for Acoustical Ceiling Units: Provide units conforming to applicable requirements of ASTM E 1264 for Class A materials.

2.2 CEILING SUSPENSION SYSTEMS - GENERAL

- A. Provide suspension systems conforming to specified requirements and to requirements of ASTM C 635.
- B. Colors: Provide indicated colors. Where color is not indicated, provide colors as selected by the architect from manufacturer's complete set of standard colors.
- C. Finishes: Manufacturer's standard shop-applied finishes.
- D. Attachment Devices for Suspension System:
 - 1. Anchors and intermediate support members: Provide sizes capable of sustaining 5 times the load-carrying capabilities shown in ASTM C 635, Table 1, "Direct Hung" column.
 - 2. Hanger wire: Zinc-coated (galvanized) carbon steel wire, ASTM A 641, soft temper, with Class 1 coating, minimum 12 gage (0.106 inch diameter).

- E. Edge Moldings and Trim:
 - 1. Extruded metal; provide molding for edges and ceiling penetrations indicated. Provide profiles suited to edge profiles of acoustical units and suspension members.
- F. Manufacturer: Provide products complying with requirements of the contract documents and made by one of the following:
 - 1. Exposed steel suspension system:
 - a. Armstrong World Industries, Inc.
 - b. Chicago Metallic Corporation.
 - c. USG Corporation.

2.3 SUSPENDED LAY-IN CEILING SYSTEM

- A. Common Area Suspended Acoustical Panels: Armstrong World Industries, Inc., Dune, Second Look, #2712.
 - 1. Size: 24 by 48 inches.
 - 2. Edge profile: Angled Tegular.
 - 3. Color: White.
- B. Suspended Acoustical Ceiling Grid System: Formed steel with painted finish.
 - 1. Profile: Single-web tee, 15/16 inch wide.
 - 2. Structural classification (ASTM C 635): Intermediate-Duty System.
 - 3. Color and texture: White color to match ceiling panels; standard smooth texture.
 - 4. Acceptable product: "Prelude"; Armstrong World Industries, Inc.

2.4 SUSPENDED DRYWALL CEILING SYSTEM

- A. Grid for drywall ceiling: Formed steel.
 - 1. Acceptable product: Chicago Metallic; 660 System

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions under which products of this section are to be installed and verify that the work properly may commence.

3.2 PREPARATION

- A. Layout: Position ceiling components to maximize use of full-sized acoustical units and to provide border units which are equal in size and shape at opposing ceiling edges. Use of acoustical units which are smaller than 1/2 full-width is prohibited at ceiling perimeters. Conform to reflected ceiling plans to greatest extent possible.

3.3 SUSPENSION SYSTEM INSTALLATION

- A. General:
 - 1. Conform to the requirements of ASTM C 636, manufacturer's installation instructions, and governing regulations.
 - 2. Install hangers plumb and supported solely by building structure or carrying channels. Do not allow hangers to contact any objects or materials in ceiling plenum which are not actual components of ceiling system.
 - a. Splay hangers only where necessary to avoid obstacles. Provide countersplaying, bracing, or other acceptable devices to compensate for lateral stresses caused by splayed hangers.
 - 3. Space hangers at not more than 48 inches on center and within 6 inches of ends of each direct-hung runner or carrying channel, unless indicated otherwise.
 - 4. Loop and tie wire hangers securely to building's structural members; to attachment devices indicated; or, where not indicated, to devices suitable for substrate and capable of permanently supporting ceiling weight without failure or deterioration.
 - 5. Level ceiling suspension system to tolerance of 1/8 inch in 12 feet, with cumulative tolerance not to exceed 1/4 inch. Bending or kinking of hangers is not allowed.
- B. Exposed (Lay-in) Grid Installation: Install grid members square, with ends of members securely interlocked. Remove and replace dented, bent, or kinked members.

3.4 TRIM INSTALLATION

- A. Install edge moldings and trim units at acoustical ceiling borders, at locations indicated, and where required to cover acoustical unit edges.
 - 1. Molding and trim attachment: Space screws not more than 16 inches on center and within 3 inches of ends of each trim-piece being installed. Install moldings and trim level with suspension system and within tolerance specified for suspension system.
 - 2. Miter corners and align butt joints carefully to form tight hairline joints.

3. Face-riveting of trim and moldings is not allowed.

3.5 LAY-IN PANEL INSTALLATION

- A. Panel Installation: Install acoustical panels for accurate fit with suspension system and trim members. Scribe and cut panels at ceiling perimeter and at obstructions to provide neat, precise fit.
 - 1. Square-edge panel installation: Provide installation with panel edges which are hidden from view, by suspension members or trim.

3.6 ADJUST AND CLEAN

- A. Use ceiling manufacturer's recommended methods and materials to clean and touch-up exposed components of ceiling system.
- B. Replace ceiling system components which are discolored or damaged in any way, in a manner which results in the ceiling system showing no evidence of replacement work.

END OF SECTION 09511

SECTION 09640 – WOOD PLANK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. NOFMA certified solid wood plank flooring.
 - 2. The Flooring Contractor shall provide all labor, materials, tools and services to furnish, deliver and install a complete wood floor system from the sub floor through the sanding and finishing, plus the installation of wood thresholds.

1.3 RELATED SECTIONS

- A. Section 09900 – Paint.

1.4 REFERENCES

- A. NOFMA: The Wood Flooring Manufacturers Association:
 - 1. Installation Manual

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors and finishes available for flooring.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed flooring similar in material, design, and extent to that indicated for this Project and whose work has resulted in flooring installations with a record of successful in-service performance.

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

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver flooring materials in unopened cartons or bundles.
- B. Protect flooring from exposure to moisture. Do not deliver flooring until after concrete, masonry, plaster, ceramic tile, and similar wet-work is complete and dry.
- C. Store flooring materials in a dry, warm, well-ventilated, weathertight location.

1.8 PROJECT CONDITIONS

- A. Conditioning: Maintain relative humidity planned for building occupants and an ambient temperature between 65 and 75 deg F (18 and 24 deg C) in spaces to receive flooring for at least seven days before installation, during installation, and for at least seven days after installation. After post-installation period, maintain relative humidity and ambient temperature planned for building occupants.
- B. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by flooring and finish manufacturers.
- C. The General Contractor shall provide a sub floor, smooth and level to a tolerance of 1/8" on a 10'0" radius.

1.9 MAINTENANCE STOCK

- A. None.

1.10 WARRANTY

- A. Warrant the material to be free from defects in materials and workmanship for a period of one year and the flooring installer warrants the installation of the flooring to be free of defects in materials and workmanship for a period of one year. The exclusive remedy under this warranty shall be replacement of defective material supplied or correction of defective installation by the flooring installer. All implied warranties of merchantability or fitness for intended use are limited to the period of this warranty. This warranty excludes consequential damages.

PART 2 - PRODUCTS

2.1 CONVENTIONAL WOOD PLANK FLOORING

- A. Provide the following.
 - a. Wood Species: Hard Maple.
 - b. NOFMA Certified Grade: 2ND Clear.
 - c. Grain/Cut Classification: Plain Sawn
 - d. Size: 1x3 (Actual 25/32" x2 1/4").
 - e. Profile: Tongue & Groove.
 - f. Edge: Square
 - g. Finish: Paint System J in Section 09900.

2.2 ACCESSORIES

- A. Fasteners as recommended by "NOFMA Installing Hardwood Flooring."
- B. Provide matching wood transition strips at carpet.
- C. Provide related items as recommended by manufacturer for proper installation.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with NOFMA product data, including:
 - 1. Product technical bulletins:
 - a. NOFMA Behavior of Flooring.
 - b. NOFMA Key to Wood Flooring Performance.
- B. Product catalog instructions.
 - 1. NOFMA Installing Hardwood Flooring.
- C. Product carton instructions.
 - 1. NOFMA Safeguards.
- D. Comply with instructions as supplied by the wood flooring manufacturer.

3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of flooring. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Follow "NOFMA Installing Hardwood Flooring."
- B. Sub Floors: Verify that sub floors comply with manufacturers requirements.
 - 1. Verify that sub flooring is dry according to test methods recommended by flooring manufacturer.
 - 2. Grind high spots and fill low spots to provide a maximum 1/4-inch (6-mm) deviation in any direction when checked with a 10-foot (3-m) straight edge.

3.3 PREPARATION

- A. Prepare surfaces as indicated in "NOFMA Installing Hardwood Flooring" to achieve the best result for substrate and conditions indicated.

3.4 INSTALLATION

- A. Install flooring in accordance with "NOFMA Installing Hardwood Flooring."
- B. Pattern: Lay planks in pattern as directed by Architect.
- C. Provide blind nailing.

3.5 FLOOR SANDING

- A. Use coarse, medium and fine grade sandpaper.
- B. After sanding with drum sander, buff entire floor using 100 grit screenback or equal grit sandpaper, with a heavy-duty buffing machine.
- C. Vacuum or tack floor before first coat of finish.
- D. Floor shall present a smooth surface without drum stop marks, gouges, streaks or shiners.

3.6 FINISHING

- A. Inspect entire area of floor to ensure that the surface is acceptable for finishing, completely free from sanding dust and perfectly clean.
- B. Provide Paint System J for Hardwood as indicated in Section 09900 except final coat to be gloss. Apply seal and finish per manufacturer's instructions.
- C. Screenback or steel wool and vacuum or tack between each coat after it dries.

3.7 PROTECTION

- A. Establish and maintain environmental conditions at occupancy levels.
- B. Cover installed flooring to protect it from damage or deterioration, before and after finishing, during remainder of construction period. Use heavy kraft-paper or other suitable covering. Do not use plastic sheet or film that could cause condensation.
- C. Repair or replace damaged products prior to Substantial Completion.

3.8 CLEANING

- A. Clean floor as recommended by manufacturer prior to substantial completion.

END OF SECTION 09640

SECTION 09660 - RESILIENT TILE FLOORING AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient tile flooring.
 - a. Vinyl composition tile.
 - 2. Resilient base.
 - 3. Transition Strips.

1.3 REFERENCES

- A. FS SS-T-312B -- Tile, Floor: Asphalt, Rubber, Vinyl, and Vinyl Composition; 1974 (Amendment-1(YD) 1979 and Reapproved 1990).
- B. FS SS-W-40A -- Wall Base: Rubber, and Vinyl Plastic; 1966 (Amended 1970 and Corrected 1974).

1.4 SUBMITTALS

- A. Product Data: Submit technical data from each manufacturer of resilient products required.
- B. Initial Samples: Submit manufacturer's standard color selection samples for resilient products required, including all available colors and patterns.
- C. Maintenance Procedures: Submit manufacturer's published instructions for care and cleaning of resilient flooring products specified.

1.5 QUALITY ASSURANCE

- A. Manufacturer: For each type of product required, including adhesives, cleaning compounds, and other accessories, provide the same product by one manufacturer throughout the project.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements: At least 48 hours prior to beginning work, move resilient flooring materials to areas of installation and maintain at minimum 70 degrees F until 48 hours after completing installation and at minimum 55 degrees F thereafter.
- B. Sequencing: Do not begin installation of resilient flooring products until painting has been completed for each area.
- C. Existing Conditions: Do not install resilient flooring on concrete substrates until testing has been conducted to assure that moisture levels are acceptable.

1.7 MAINTENANCE

- A. Extra Materials: None.

PART 2 - PRODUCTS

2.1 TILE FLOORING MATERIALS

- A. Vinyl Composition Tile:
 - 1. Manufacturer: "Standard Excelon" Imperial Texture; Armstrong World Industries, Inc.
 - a. Alternate manufacturers: The Architect will be the sole judge of equivalence.
 - 2. Size and gage: 12 inches by 12 inches, 1/8 inch thickness.

2.2 RESILIENT BASE MATERIALS

- A. Vinyl Wall Base: FS SS-W-40a, Type TV, Group 1 (solid) and as follows:
 - 1. Manufacturers: Provide products complying with requirements of the contract documents and made by the following:
 - a. Johnsonite.
 - b. Height: 4 inches.
 - c. Thickness: 1/8 inch.
 - d. Provide in 100' or 120' rolls.
 - e. Style: Standard toe base for resilient tile flooring installations.
 - f. Corners: Preformed or molded units matching base in color and finish.
 - g. Finish: Dull, or matte.

2.3 VINYL TRANSITION STRIPS

- A. Manufacturer: Johnsonite, Inc.
- B. Provide corresponding manufacturer's recommended receiver.
- C. Standard Unit VCT to Carpet with pad: CD-XX-B.
 - 1. Color: To match adjacent resilient base material.
- D. Standard Unit Direct Glue Down Carpet to Carpet with pad: CE-XX-C.
 - 1. Color: To match adjacent resilient base material.
- E. HC Unit Ceramic Tile to Direct Glue Down Carpet: CTA-XX-L.
 - 1. Color: To match adjacent resilient base material.
- F. Direct Glue Down Carpet to Direct Glue Down Carpet: CD-XX.
 - 1. Color: To match adjacent resilient base material.
- G. Direct Glue Down Carpet to VCT: CE-XX-A.
 - 1. Color: To match adjacent resilient base material.
- H. Carpet with pad to Ceramic Tile: CD-XX-A.
 - 1. Color: To match adjacent resilient base material.
- I. Vestibules Tile to Entry Mat: CD-XX-A.
- J. Color: To be selected from manufacturer's standard selection.

2.4 MISCELLANEOUS ACCESSORIES

- A. Adhesive: Type recommended by manufacturer of resilient product for specific substrate conditions.
- B. Primer: Type recommended by manufacturer of resilient product for application to concrete substrates.
- C. Patching Compound: Latex leveling and patching compound acceptable to manufacturer of resilient flooring product.
- D. Neutral detergent solution cleaner and high quality commercial floor polish as recommended by manufacturer.

2.5 COLORS AND PATTERNS

- A. Provide colors and patterns of resilient flooring materials as selected by the architect from manufacturer's standard product line.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Inspect substrates and conditions of installation to verify that work may properly commence. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Concrete Substrates: Perform manufacturer's recommended moisture tests before beginning installation, to verify that concrete surfaces have cured sufficiently to allow adhesive bond to resilient flooring.

3.2 PREPARATION

- A. Substrates: Fill minor depressions, cracks, and other irregularities with patching compound.
 - 1. Remove paint, curing compounds, and other materials that could interfere with adhesion of resilient products.
 - 2. Sweep or vacuum clean substrate immediately prior to beginning installation in each area.
 - 3. Apply primer to concrete substrates prior to application of adhesive, following manufacturer's printed instructions.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with manufacturer's published recommendations for installation in each area, extending resilient flooring into spaces which are partially concealed. Cut and fit tightly to fixtures, pipes, and other obstructions, as well as to walls and partitions.
- B. Tightly adhere resilient flooring to substrate with no open joints or cracks, and without raised or blistered areas. Spread adhesive evenly, so that final installation will be without telegraphed markings from adhesive or substrate.

3.4 TILE INSTALLATION

- A. Layout: Establish center of each space and lay tile from center point, so tiles at each edge will be not less than 1/2 tile and equal in width.
- B. Matching: In each space, use tiles from same production run, and lay tiles in same sequence as removed from cartons. Discard broken, chipped, or otherwise damaged tiles.
 - 1. Lay tile square to room axis.
 - 2. In apartment units lay tile with pattern in all tiles oriented with grain parallel to corridor wall.

3. In common area or public rooms lay tile with pattern in adjacent tiles oriented in opposite directions.

C. Installation: Apply adhesive with notched trowel, following manufacturer's instructions. Install tile only after adhesive has developed sufficient tack, firmly butting tiles to achieve hairline joints. Roll each area of installation at regular intervals, to assure firm bonding of tiles to substrate.

3.5 INSTALLATION OF RESILIENT BASE

A. Apply base securely in locations indicated, using maximum lengths available to minimize joints. Adhere to substrate with full spread of adhesive, assuring continuous contact with vertical and horizontal surfaces. Provide preformed corner units at 90 degree intersections.

1. At irregular vertical surfaces where top edge of resilient base does not make continuous contact, fill voids with manufacturer's recommended adhesive compound.

3.6 INSTALLATION OF MISCELLANEOUS ACCESSORIES

A. Resilient Edge Strips: At locations shown on drawings, or where otherwise required to protect edge of resilient flooring, install resilient edge strips securely with recommended adhesive, to achieve tightly butted joint.

3.7 CLEANING

A. Initial Cleaning: Remove excess and waste materials promptly, and sweep or vacuum clean resilient flooring as soon as installation has been completed in each area. After adhesive has had adequate time to set, mop each area with damp mop and mild detergent.

B. Final Cleaning: Remove scuff marks, excess adhesive, and other foreign substances, using only cleaning products and techniques recommended by manufacturer of resilient products.

C. Install three coats of floor polish on all areas of resilient tile installations following manufacturer's installation instructions.

3.8 PROTECTION

A. Construction Period: Cover traffic routes across completed resilient flooring with plywood, hardboard, or other durable material to protect against damage from loaded dollies and other construction traffic.

- B. Final Protection: Cover resilient floor surface with nonstaining building paper until substantial completion in each area.

END OF SECTION 09660

SECTION 09665 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient sheet flooring.
 - a. Proprietary sheet product.
- B. Related Sections:
 - 1. Finish of concrete substrate for resilient flooring installation: Division 3.
 - 2. Carpet: Elsewhere in Division 9.

1.3 REFERENCES

- A. ASTM F-1861-98, Standard Specifications for Resilient Wall Base.
- B. FS SS-W-40A -- Wall Base: Rubber, and Vinyl Plastic; 1966 (Amended 1970 and Corrected 1974).
- C. ASTM F-1344-93, Standard Specifications for Rubber Floor Tile.

1.4 SUBMITTALS

- A. Product Data: Submit technical data from each manufacturer of resilient products required.
- B. Initial Samples: Submit manufacturer's standard color selection samples for resilient products required, including all available colors and patterns.
- C. Maintenance Procedures: Submit manufacturer's published instructions for care and cleaning of resilient flooring products specified.

1.5 QUALITY ASSURANCE

- A. Manufacturer: For each type of product required, including adhesives, cleaning compounds, and other accessories, provide the same product by one manufacturer throughout the project.
- B. Installer: Manufacturer-certified for acceptable performance in installation of vinyl flooring with heat-welded seams.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements: At least 48 hours prior to beginning work, move resilient flooring materials to areas of installation and maintain at minimum 70 degrees F until 48 hours after completing installation and at minimum 55 degrees F thereafter.
- B. Sequencing: Do not begin installation of resilient flooring products until painting has been completed for each area.
- C. Existing Conditions: Do not install resilient flooring on concrete substrates until testing has been conducted to assure that moisture levels are acceptable.

1.7 MAINTENANCE

- A. Extra Materials: None.

PART 2 - PRODUCTS

2.1 SHEET FLOORING MATERIALS

- A. Type Resilient Sheet:
 - 1. Manufacturer: Mannington, Vega II.
 - 2. Roll width: manufacturer's standard.

2.2 SEAM MATERIALS

- A. Double cut method with manufacturer's standard heat weld.

2.3 MISCELLANEOUS ACCESSORIES

- A. Adhesive: Type recommended by manufacturer of resilient product for specific substrate conditions.
- B. Primer: Type recommended by manufacturer of resilient product for application to concrete substrates.

- C. Patching Compound: Latex leveling and patching compound acceptable to manufacturer of resilient flooring product.
 - 1. Neutral detergent solution cleaner and high quality commercial floor polish as recommended by manufacturer.

2.4 COLORS AND PATTERNS

- A. Provide colors and patterns of resilient flooring materials as selected by the architect from manufacturer's standard product line.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Inspect substrates and conditions of installation to verify that work may properly commence. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Concrete Substrates: Perform manufacturer's recommended moisture tests before beginning installation, to verify that concrete surfaces have cured sufficiently to allow adhesive bond to resilient flooring.

3.2 PREPARATION

- A. Substrates: Fill minor depressions, cracks, and other irregularities with patching compound.
 - 1. Remove paint, curing compounds, and other materials that could interfere with adhesion of resilient products.
 - 2. Sweep or vacuum clean substrate immediately prior to beginning installation in each area.
 - 3. Apply primer to concrete substrates prior to application of adhesive, following manufacturer's printed instructions.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with manufacturer's published recommendations for installation in each area, extending resilient flooring into spaces which are partially concealed. Cut and fit tightly to fixtures, pipes, and other obstructions, as well as to walls and partitions.
- B. Tightly adhere resilient flooring to substrate with no open joints or cracks, and without raised or blistered areas. Spread adhesive evenly, so that final installation will be without telegraphed markings from adhesive or substrate.

- C. Layout seams to be in an existing line of the pattern selected to maintain flooring pattern across seam.

3.4 RESILIENT SHEET FLOORING INSTALLATION

- A. Layout and Matching: Establish optimum use of material with minimum number of seams in each space. Match patterns carefully at seams, following manufacturer's directions.
- B. Flooring: Follow manufacturer's directions for application of adhesive, using full spread method unless perimeter bonding technique is specifically recommended by manufacturer for substrate condition. Apply recommended adhesive or sealant at seams, and roll in accordance with manufacturer's recommendations to achieve flat, blister-free installation.
- C. Chemical Welding: Follow manufacturer's recommendations to achieve flat, seamless installation.

3.5 INSTALLATION OF MISCELLANEOUS ACCESSORIES

- A. Resilient Edge Strips: At locations shown on drawings, or where otherwise required to protect edge of resilient flooring, install resilient edge strips securely with recommended adhesive, to achieve tightly butted joint.

3.6 CLEANING

- A. Initial Cleaning: Remove excess and waste materials promptly, and sweep or vacuum clean resilient flooring as soon as installation has been completed in each area. After adhesive has had adequate time to set, mop each area with damp mop and mild detergent.
- B. Final Cleaning: Remove scuff marks, excess adhesive, and other foreign substances, using only cleaning products and techniques recommended by manufacturer of resilient products.
- C. Install three coats of floor polish on all areas of resilient tile installations following the manufacturer's installation instructions.

3.7 PROTECTION

- A. Construction Period: Cover traffic routes across completed resilient flooring with plywood, hardboard, or other durable material to protect against damage from loaded dollies and other construction traffic.
 - 1. Polish: Apply protective polish to clean resilient flooring surfaces, unless manufacturer of resilient product recommends otherwise.

- B. Final Protection: Cover resilient floor surface with nonstaining building paper until substantial completion in each area.

END OF SECTION 09665

SECTION 09680 - CARPET

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Broadloom carpet.
 - 2. Carpet cushion.
 - 3. Carpet accessories.
- B. Related Sections:
 - 1. Resilient flooring: Division 9.
 - 2. Resilient base: Elsewhere in Division 9.

1.3 REFERENCES

- A. 16 CFR, Chapter 11, Part 1630 - Standard for the Surface Flammability of Carpets and Rugs (FF 1-70); Code of Federal Regulations; 1988.
- B. ASTM D 2859-76 -- Standard Test Method for Flammability of Finished Textile Floor Covering Materials; 1976.
- C. FS L-C-001676 (GSA-FSS) -- Cushion, Carpet and Rug, Prime Urethane; 1970 (Amended 1971).
- D. Use of Materials Bulletin No. 44d-1986 -- HUD Building Product Standards and Certification Program for Carpet and Carpet with Attached Cushion; U.S. Department of Housing and Urban Development; 1986.

1.4 SUBMITTALS

- A. Product Data: Submit technical data for each distinct type of carpeting material and accessory indicated.
 - 1. Include information which specifically details physical properties and performance characteristics.
 - 2. Include information which details installation methods for substrates indicated.

- B. Shop Drawings:
 - 1. For broadloom, show the following:
 - a. Carpet direction, seaming plan, edge strip placement.
 - b. Other details as necessary to clearly indicate arrangement of carpeting materials.
 - 2. Include details for the following:
 - a. Seam locations for all common areas and typical unit layouts.
- C. Initial Selection Samples: For each carpet type indicated, submit manufacturer's standard samples showing full range of colors, textures, and patterns available.
- D. Certification:
 - 1. Submit manufacturer's certification that materials furnished comply with requirements indicated. Include official results from independent testing agency which establish that materials meet or exceed test requirements indicated.
 - 2. Submit manufacturer's certification that materials furnished comply with requirements of "Use of Materials Bulletin No. UM-44D" (U.S. Department of Housing and Urban Development), that they are presently included in a Certified Carpet Directory (published by a HUD-approved testing agency), and that backing of carpet will be clearly imprinted with HUD-approval mark.
- E. Maintenance Instructions: Submit manufacturer's instructions for maintaining appearance and condition of installed products. Include information on cleaning materials which could damage carpet.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firm regularly engaged in manufacture of products specified in this section, whose products have been in satisfactory use, under similar service conditions, for not less than 5 years.
- B. Installer's Qualifications: Firm regularly engaged in installation of products specified in this section, with a minimum of 5 years of experience.

1.6 PERFORMANCE CHARACTERISTICS

- A. Fire Performance: Provide carpet materials capable of meeting the following requirements when tested in accordance with methods indicated, by UL (Underwriters Laboratories Inc.) or other independent testing agency acceptable to governing authorities.
 - 1. Methenamine pill test (ASTM D 2859): Passes.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Take measures as required to ensure materials are not damaged or deformed. Store products in flat position in properly ventilated, dry space. Use suitable means to prevent materials from lying in direct contact with the ground.
- B. Allow carpet materials to reach room temperature or minimum temperature recommended by manufacturer before installation.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate work of this section with other work to ensure that installed carpeting materials are not damaged or soiled.

1.9 WARRANTY

- A. Submit a written warranty signed by the manufacturer, installer, and the contractor, guaranteeing to correct failures in carpeting which occur within 2 years after substantial completion, without reducing or otherwise limiting any other rights to correction which owner may have under the contract documents. Failures are defined to include faulty workmanship or faulty materials. Correction may include repair or replacement.

1.10 MAINTENANCE MATERIALS

- A. Extra Materials: Provide 24 square yards of Carpet B.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Single Source Responsibility: Obtain all of each different material from a single manufacturer.

2.2 MATERIALS

- A. Carpet A :
 1. Location: As indicated on the drawings.
 2. Manufacturer/Style: Shaw 19299, Awakening, Color 701
 3. Alternate manufacturers: The Architect shall be the sole judge of equivalence. Mohawk carpet is not an approved equal.
 4. Color/texture/pattern: To be selected from manufacturer's standards.
 5. Installation method: Action Back, Stretch application w/ pad; Unitary Back, Direct Glue Down unless not recommended by manufacturer.
 6. Edge guard: Vinyl or rubber.

- B. Carpet B :
 - 1. Location: As indicated on the drawings.
 - 2. Manufacturer/Style: Shaw Contract, "Turn Key" 24-28 oz.
 - 3. Alternate Manufacturer/Style: J&J Commercial, Link 28 oz, Mannington, Game Time/Half Time.
 - 4. Alternate manufacturers: The Architect shall be the sole judge of equivalence. Mohawk carpet is not an approved equal.
 - 5. Color/texture/pattern: To be selected from manufacturer's standards.
 - 6. Installation method: Action Back, Stretch Application w/ pad; Unitary Back, Direct Glue Down unless not recommended by manufacturer.
 - 7. Edge guard: Vinyl or rubber.

- C. Cushion: Provide mildew resistant cushion which is capable of passing ASTM D 2859 [16 CFR, Chapter 11, Part 1630 (FF 1-70)] flammability test.
 - 1. Shaw "Endurance II" 7011, synthetic fiber cushion, 32 oz.
 - 2. Traffic designation: I - Moderate.
 - 3. Minimum density: 8.9 pounds per cubic foot.
 - 4. Thickness: .30 inch.

2.3 ACCESSORIES

- A. Provide accessories recommended by carpet manufacturer.

- B. Carpet Gripper: Water-resistant plywood strips with projecting pins designed to grip carpet, thickness suitable for carpet and cushion installed.
 - 1. Provide commercial stripping with a minimum of 3 rows of projecting pins in areas where carpet width exceeds 20 feet and in areas which will receive heavy traffic.

- C. Vinyl or Rubber Edge Guard: Minimum width of anchorage flange 2 inches, size and shape indicated, colors selected by the architect from manufacturer's standards.

- D. Carpet Installation Adhesive: Manufacturer's recommended water-resistant adhesive manufactured for use with type of carpet and substrates indicated, and complying with fire performance requirements indicated for carpet.

- E. Carpet Seaming Cement and Tape: Carpet manufacturer's recommended products manufactured for use with type of carpet indicated.

- F. Cushion Adhesive: Provide cushion manufacturer's recommended mildew-resistant product for carpet cushion and application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Verify that substrates are completely dry, free of harmful substances, and in satisfactory condition to receive carpeting materials.
- B. Notify the architect in writing of unsatisfactory conditions. Do not begin installation until these conditions have been satisfactorily corrected.
- C. Start of installation work constitutes acceptance of substrate conditions and full responsibility for the completed work.
- D. Perform moisture and acidity tests on concrete surfaces where recommended by carpet manufacturer.

3.2 PREPARATION

- A. General: Follow carpet manufacturer's recommendations to ensure that each substrate is properly prepared to receive carpeting. Fill all cracks, gaps, and depressions using carpet manufacturer's recommended materials and methods.
 - 1. Stretch-in installation: Maximum variation in substrate 1/4 inch in 10 feet.
 - 2. Glue-down installation: Maximum variation in substrate 1/8 inch in 10 feet.
- B. Level off all high spots or ridges to prevent uneven carpet wear.
- C. Determine whether substrates are susceptible to dusting. Apply sealer where required to prevent formation of dust.
- D. Vacuum-clean substrates thoroughly, just prior to beginning installation.
- E. Maintain temperature of floor and relative humidity of rooms where carpet materials are to be installed at levels and for periods recommended by carpet manufacturer before, during, and after installation.

3.3 INSTALLATION - GENERAL

- A. Perform installation in accordance with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
 - 1. Maximize consistency of carpet appearance, particularly in terms of lay of pile and its direction. Follow manufacturer's recommendations for placement of seams.
 - 2. Continue carpet into recessed spaces such as closets, and underneath obstacles with open bases.
 - 3. Follow manufacturer's instructions for cutting carpet, using tools designed to cut type of carpet materials being installed.
- B. Provide noncombustible carpet separator wherever carpet materials are to be installed on both sides of a fire door.
- C. At door openings, orient carpet seam perpendicular to traffic direction; doorway seam must be located directly underneath door in closed position.
- D. At stairs, provide safe, wear-resistant installation; maximize consistency of appearance between carpet at stairway and adjacent carpet; conceal carpet edges.

3.4 INSTALLATION - STRETCH-IN CARPET

- A. Install carpet gripper at perimeter of each area to receive carpet, at cutouts, and where carpeting abuts obstacles with closed bases. Anchor gripper using non-staining adhesive, mechanical fasteners, or both if necessary to provide secure attachment.
- B. Install carpet cushion at location indicated. Orient cushion seams perpendicular to carpet seams; install with correct surface in upward position. If recommended by the carpet manufacturer, attach cushion to substrate using cushion manufacturer's recommended adhesive. Tape seams using cushion manufacturer's recommended tape.
- C. Seams: Using carpet manufacturer's recommended procedures, form secure seams capable of sustaining expected stresses without failure for the life of the installation.
 - 1. Seams: Conform to submitted seaming plan.

- D. Stretch carpet in strict accordance with carpet manufacturer's instructions; do not overstretch.
- E. Install edge guards at exposed carpet edges unless indicated otherwise; provide secure attachment to substrate.
- F. Securely bind carpet edges not covered by edge guards or similar installation accessories.

3.5 INSTALLATION - GLUE-DOWN CARPET

- A. Before applying adhesive to substrate, prefit carpet in areas where it is to be installed. Where cutting is necessary, provide properly prepared, straight, and unfrayed edges.
 - 1. Seams: Conform to submitted seaming plan.
- B. Apply even layer of adhesive to substrate, using trowel of carpet manufacturer's recommended notch size.
- C. Install prefitted carpet; butt edges snugly at seams and against vertical obstructions.
 - 1. Stretch carpet tightly over substrate, so that it lies flat, is uniformly smooth, and free of bulges.
 - 2. Apply seaming cement to butted edges.
- D. Install edge guards at exposed carpet edges unless indicated otherwise; provide secure attachment to substrate.
- E. After installation, lightly roll carpet as recommended by carpet manufacturer.
- F. Immediately remove adhesive from surface of carpet by method which will not damage carpet.

3.6 CLEANING

- A. Remove carpet remnants which are not usable; comply with owner's instructions for final disposition of usable remnants.
- B. Use commercial-quality vacuum cleaner to thoroughly clean installed carpeting; trim loose yarns where required.
- C. Eliminate stains; contractor shall pay for and replace carpet from which stains cannot be eliminated using carpet manufacturer's recommended products and methods.

3.7 PROTECTION

- A. Protect installation with a nonstaining building paper. Do not use a moisture barrier such as plastic film.
- B. Do not permit foot traffic or place furniture on glued-down carpet for a minimum of 48 hours after installation.
 - 1. Do not wet-clean any glued-down carpet within 60 days of installation.
- C. Ensure that carpet will be clean and without deterioration or damage at date of substantial completion.

END OF SECTION 09680

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Painting and finishing of exposed exterior items and surfaces.
 - 2. Painting and finishing of exposed interior items and surfaces.
- B. Section does not include:
 - 1. Factory finishing of manufactured products.
 - 2. Painting of concealed surfaces, unless specifically indicated.
 - 3. Prefinished metal surfaces.
 - 4. Moving parts of equipment.
- C. Related Sections:
 - 1. Shop priming of ferrous metal: Division 5.
 - 2. Shop priming of metal doors and frames: Division 8. Shop priming of wood doors: Division 8.
 - 3. Painting of mechanical work: Division 15.
 - 4. Painting of electrical work: Division 16.

1.3 DEFINITIONS

- A. DFM (dry film mils): Thickness, measured in mils, of a coat of paint in the cured state.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's technical data sheets for each coating.
 - 1. Material analysis including vehicle type and percentage by weight and by volume of vehicle, resin, and pigment.
 - 2. Application instructions including mixing, surface preparation, compatible primers and topcoats, recommended wet and dry film thickness, recommended application methods.

1.5 QUALITY ASSURANCE

- A. Materials:
 - 1. All coating materials required by this section shall be provided by a single manufacturer, unless otherwise required or approved.
- B. Applicator: Firm with not less than 3 years of successful experience in painting work similar in scope to work of this project.
 - 1. Maintain throughout duration of the work a crew of painters who are fully qualified to satisfy requirements of the specifications.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original containers bearing coating name and color, material composition data, date of manufacture, legal notices if applicable, and mixing, thinning, and application instructions.
- B. Storage:
 - 1. Store materials in an orderly fashion and in clean, well-closed containers with labels intact.
 - 2. Maintain above 40 degrees F. Do not allow materials to freeze.

1.7 PROJECT CONDITIONS

- A. Apply coatings only under the following environmental conditions:
 - 1. Air and surface temperatures are between 50 and 100 degrees F, unless otherwise recommended by manufacturer.
 - 2. Surface temperature is at least 5 degrees F above dew point.
 - 3. Relative humidity is less than 85 percent.
- B. Do not apply coatings during inclement weather except within enclosed, conditioned spaces.
 - 1. Provide temporary lighting to achieve a well-lit surface with a level of at least 80 footcandles measured mid-height.
 - 2. Provide continuous ventilation and heating to prevent accumulation of hazardous fumes and to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and for 48 hours after application of finishes, or longer if required to obtain full cure as indicated by manufacturer's instructions.

1.8 COORDINATION

- A. General: Perform work in proper sequence with work of other trades to avoid damage to finished work.

- B. Coordination: Where special coatings will be applied over shop coatings specified in other sections, coordinate work of such other sections to ensure that only approved, compatible primers are applied.
 - 1. Furnish the architect with product data on both coatings demonstrating coating compatibility.

1.9 MAINTENANCE STOCK

- A. Paint: At time of completing application, deliver stock of maintenance material to the owner. Furnish not less than one properly labeled and sealed 1-gallon can of each type of finish coat of each color, taken from lots furnished for the work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The brand-name products listed in the schedule at the end of this section and made by the following manufacturer are the basis of the contract documents:
 - 1. Sherwin Williams Company.
- B. Products made by one of the following manufacturers will be considered in accordance with standard substitution procedures:
 - 1. The Glidden Company.
 - 2. Benjamin Moore & Company.
 - 3. PPG Industries, Inc./Pittsburgh Paints.

2.2 PRODUCTS

- A. Colors:
 - 1. For multicoat systems, apply each coat using a successively darker tint or shade, unless approved otherwise. Provide primer tinted 1/2 shade of top coat color selected.
 - 2. Top coat colors: As selected during construction. Allow for 5 colors of each sheen.
- B. Lead Content:
 - 1. Not permitted.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Verify that surfaces and conditions are ready for work in accordance with coating manufacturer's recommendations.

- B. Prior to commencement of work, examine surfaces scheduled to be finished.
 - 1. Report any unsatisfactory conditions in writing.
 - 2. Do not apply coatings to unsatisfactory substrates.
 - 3. Beginning painting work on an area will be deemed construed acceptance of surfaces in that area.

3.2 SURFACE PREPARATION

- A. Apply coatings to surfaces that are clean and properly prepared in accordance with manufacturer's instructions and as herein specified. Remove dirt, dust, grease, oils, and foreign matter. Prepare surface for proper texture necessary to optimum coating adhesion and intended finished appearance. Plan cleaning, preparation, and coating operations to avoid contamination of freshly coated surfaces.
 - 1. Do not apply coatings to labels that identify equipment, fire-resistance ratings, etc.
 - 2. Remove hardware, cover plates, and similar items before applying coatings.
 - 3. Provide protection for non-removable items not scheduled for coating. After application of coatings, install removed items. Use only skilled workmen for removal and replacement of such items.
 - 4. Protect surfaces not scheduled for coating. Clean, repair, or replace to the satisfaction of the architect any surfaces inadvertently spattered or coated.
- B. Wood: Scrape and remove any sap or pitch deposits from surface and clean with mineral spirits. Seal any knots and pitch pockets with a suitable product recommended by the coating manufacturer. Sand rough spots. Remove dust.
 - 1. After first coat has dried, fill holes, cracks, or depressions with a suitable wood filler recommended by the coating manufacturer. Sand filler when dry.
 - 2. Sand surfaces lightly between successive coats. Remove dust.
- C. Ferrous Metal:
 - 1. Clean and prepare surface profile in accordance with the applicable SSPC specifications for hand tool or power tool cleaning.
 - 2. Intricate fabricated shapes may be pickled in lieu of hand or power tool cleaning.
 - 3. Before hand or power tool cleaning, remove visible oil, grease, soluble welding residue, and salts by solvent cleaning. After hand or power tool cleaning, reclean surfaces if necessary.

4. Before touching up coatings damaged by handling or welding, reprepare damaged surfaces.

D. Gypsum Board:

1. Latex-fill minor defects.
2. Spot-prime defects after repair.

E. Plaster:

1. Fill hairline cracks, small holes, and imperfections with latex patching plaster.
2. Make smooth and flush with adjacent surfaces.
3. Wash and neutralize high-alkali surfaces.

F. Mildew:

1. Remove mildew by scrubbing with solution of trisodium phosphate and bleach.
2. Rinse with clean water and allow surface to dry.

G. Existing surfaces:

1. Prepare surfaces following manufacturer's installation instructions.

3.3 MIXING AND THINNING

- A. Remove and discard any skin formed on surface of coatings in containers. Discard any containers where skin comprises 2 percent or more of the remaining material. Do not add thinner except as specifically recommended (not merely permitted) by the coating manufacturer for proper coating application under the circumstances prevailing at the project site when application equipment recommended by the coating manufacturer is employed. Use only the quantities and the types of thinner recommended.
- B. Mix materials using mechanical mixers in accordance with coating manufacturer's instructions. Agitate mixed materials during application if recommended by manufacturer.
- C. Combine multi-component paints in quantities needed for use within the manufacturer's recommended pot life at the anticipated application temperatures. Discard remaining mixed material after pot life has expired.
- D. Strain pigmented coatings after mixing except where mechanical application equipment is provided with effective strainers.

- E. Tinting: Except where coating materials cannot be tinted, tint each successive coat of paint a sufficiently contrasting tone to facilitate identification of complete coating coverage.

3.4 APPLICATION

A. General:

1. Apply coatings in accordance with coating manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to be coated.
2. Employ only application equipment that is clean, properly adjusted, in good working order, and of the type recommended by the coating manufacturer.
3. Apply successive coats after adequate cure of the preceding coat and within the recommended recoating time.
4. Apply each coat to achieve the dry film thickness per coat recommended by the coating manufacturer. Application rates in excess of those recommended and fewer numbers of coats than specified will not be accepted.
5. Completed coatings shall be free of defects such as runs, sags, variations in color, lap or brush marks, holidays, and skips.
6. Apply coatings according to the schedule at the end of this section and as otherwise indicated. Coat all similar surfaces not specifically mentioned unless specifically exempted.
 - a. Ensure that all surfaces receive a dry film thickness equivalent to those of flat surfaces.
7. Coat front and back of miscellaneous items such as covers, access panels, and grilles. Apply fully finish coats behind movable items of furniture and equipment before installation. Apply prime coat only behind non-movable items of furniture and equipment before installation.
8. Sand gloss coats before applying subsequent coatings.

- B. Remove coatings not in compliance with this specification, reclean and re-prepare surfaces as specified, and apply coatings to comply with the contract documents.

C. Scheduling:

1. Apply first coat of material to properly prepared surfaces without delay.
 - a. Apply successive coats within the time limits recommended by the manufacturer.

3.5 PRIME COATS

A. General:

1. Field apply bottom coats scheduled except where the contract documents require shop coating of ferrous metals.
2. Where first coat shows signs of suction spots or poorly sealed areas, reapply first coat material to adequately seal surface before proceeding with successive coats.
3. Ferrous metals that have not been shop primed shall be field primed promptly after arrival at the site or shall be stored away from the effects of weather.
4. Reprepare and retouch damaged prime coats using approved, compatible primer.

B. Primers for Wood and Wood Products:

1. Apply first coat to wood upon receipt at the site and before wood is exposed to sun or rain.
2. Before installation, prime both concealed and exposed surfaces of interior wood, including cut ends.
3. Finish tops, bottoms, edges, and cutouts of exterior wood doors as scheduled for exterior face.
4. Backprime concealed surfaces and cut edges of exterior wood trim prior to installation.
5. Prime edges and ends, including cut surfaces, of exterior plywood prior to installation.

3.6 FINISH COATS

A. Number of Coats and Minimum Coating Thickness:

1. Apply not less than the number of coats indicated.
2. Apply each coat to achieve not less than the dry film thicknesses indicated per coat.
3. Apply additional coats at no additional cost to the owner when necessary to achieve complete hiding, uniform texture, or uniform sheen and appearance.

3.7 CLEANING AND PROTECTION

A. Cleaning:

1. Clean work area on a daily basis; dispose of spent materials and empty containers. If requested, turn over to the architect all empty coatings containers used during the course of each day.

2. Remove all trace of coatings from adjacent surfaces not scheduled to be coated. Remove by appropriate methods that do not damage surfaces.

B. Protection:

1. Protect work against damage until fully cured. Provide signs identifying wet surfaces until surfaces are adequately cured.
2. Shortly before final completion of the project, examine surfaces for damage to coatings and restore coatings to new, undamaged condition.
3. Touch-up of minor damage will be acceptable where result is not visibly different from surrounding surfaces. Where result is different either in color, sheen, or texture, recoat entire surface.

3.8 SCHEDULE OF COATINGS FOR EXTERIOR SURFACES (Refer to Room Finish Schedule and Door Schedule for paint application.)

A. Wood, Fiberglass and PVC – Trim, Casing, Doors and Columns

1. Latex, Satin
 - a. Bottom coat (unfinished fiberglass and wood only): A-100 Exterior Latex Primer B42W41.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: Super Paint Exterior Latex Satin A89 Series.

B. Ferrous Metal:

1. Latex, gloss.
 - a. Bottom coat: ProCryl Universal Metal Primer B66W310.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: DTM Acrylic Gloss Coating B66-100 Series.

K. Pressure Treated Decks (Refer to Room Finish Schedule):

1. Solid Stain.
 - a. Bottom coat: Same as Top Coat.
 - b. Top coat: Cabot Solid Color Decking Stains #1800 Series.

L. Pressure Treated Decks, Hardwood Decks and Wood Fences(Refer to Room Finish Schedule):

1. Clear Stain.
 - a. One Top coat: Cabot Decking Stain #7400 Series.

N. Fiber Cement Siding and Trim:

1. Latex, Satin
 - a. Bottom coat: Factory primed.
 - b. Intermediate coat: Shop applied Color Plus.
 - c. Top coat: Field applied Super Paint Exterior Latex Satin A89 Series.

3.9 SCHEDULE OF COATINGS FOR INTERIOR SURFACES

- C. Wood, Fiberglass & Urethane Trim, Casing and Molding :
 - 1. Latex Semi-Gloss.
 - a. Bottom coat: ProGreen 200 Latex Primer B28W600.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: ProGreen 200 Low VOC Int. Latex Semi-Gloss B31-600 Series.

- D. Ferrous Metal, Handrails, Doors and Frames:
 - 1. Latex, Semi-gloss.
 - a. Bottom coat: ProCryl Universal Metal Primer B66W310.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: DTM Acrylic Semi-Gloss Coating B66-200 Series.

- E. Gypsum Wallboard & Plaster Walls (Not noted in Paint System F Below):
 - 1. Latex, Egg-Shell.
 - a. Bottom coat: ProGreen 200 Latex Primer B28W600.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: ProGreen 200 Low VOC Interior Latex Eg-Shel B20-600 Series.

- F. Gypsum Wallboard Walls (Bathrooms, Laundry and Mechanical):
 - 1. Latex, Satin.
 - a. Bottom coat (paperless drywall): Builders Solution Latex Primer/Surfacer.
 - b. Bottom coat (paper drywall): ProGreen 200 Latex Primer B28W600.
 - c. Intermediate coat: Same as top coat.
 - d. Top coat: Bath Paint Satin Finish A57 Series.

- G. Gypsum Wallboard & Plaster Ceilings(Not noted in Paint System H Below):
 - 2. Latex, flat.
 - a. Bottom coat: ProGreen 200 Latex Primer B28W600.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: ProGreen 200 Low VOC Interior Latex Flat, B30-600 Series.

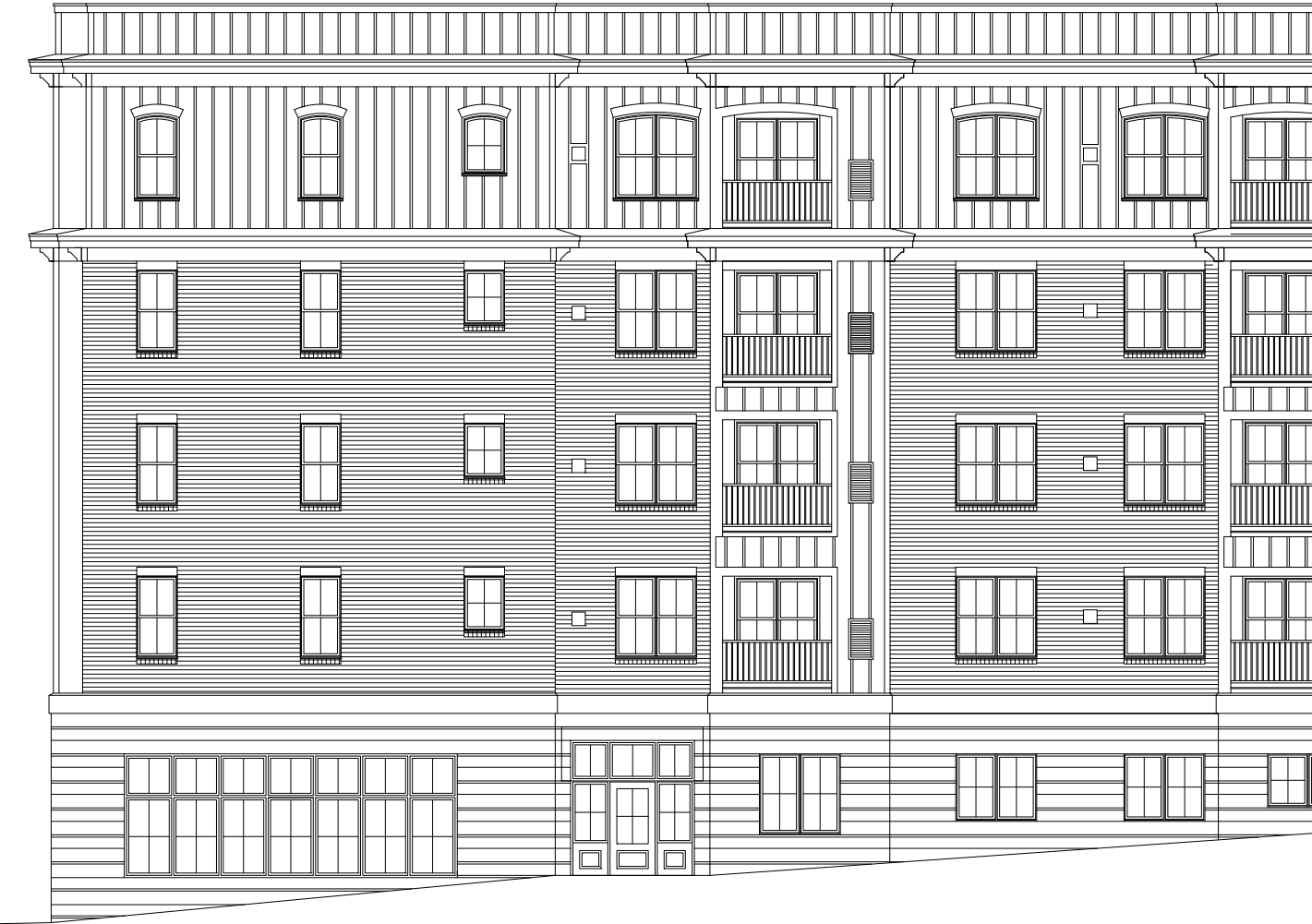
- H. Gypsum Wallboard Ceilings (Bathrooms, Laundry and Mechanical):
 - 3. Latex, Satin.
 - a. Bottom coat (paperless drywall): Builders Solution Latex Primer/Surfacer.
 - b. Bottom coat (paper drywall): ProGreen 200 Latex Primer B28W600.
 - c. Intermediate coat: Same as top coat.
 - d. Top coat: Bath Paint Satin Finish A57 Series.

- J. Hardwood Wood Floor, Trim, Handrails or Doors:
 - 1. Varnish, satin (filled and stained wood).
 - a. Filler: Sher-Wood Natural Filler D70T1 Series (open grain wood)
 - b. Stain: Minwax 250 Wood Finish Stain.
 - c. Intermediate coats: Same as Top Coat.
 - d. Second Intermediate coats: Same as Top Coat.
 - e. Top coat: Wood Classics Polyurethane Satin A67 Series.

- M. Masonry and Concrete Surfaces:
 - 1. Alkyd, flat.
 - a. Bottom coat: Heavy Duty Block Filler; 10.0 – 18.0 DFM.
 - b. Intermediate coat: Same as top coat.
 - c. Top coat: Waterborne Acrylic Dry Fall Eg-Shel White; B42-W1.

END OF SECTION 09900

DIVISION 10 Specialties



SECTION 10305 – FIRPLACES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Furnish all products, materials, accessories, and labor necessary to provide a complete installation of the factory built fireplaces within the specifications, drawings and other guidelines set forth for this project. All work shall also be performed within the scope of the manufacturer's warranty

1.3 RELATED SECTIONS

- A. Division 9 Paint
- B. Division 15 Mechanical
- C. Division 16 Electrical

1.4 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

- A. Delivery of all products shall be scheduled so as to allow for prompt installation immediately following delivery. All materials shall be fully protected from damage from other trades as well as damage from inclement weather and other unforeseen job site hazards.

1.5 QUALITY ASSURANCE

- A. Any variations from the manufacturer's installation instructions must be approved by the manufacturer's technical support department in writing and submitted to the architect prior to submitting a bid. In addition, each bidder shall submit a copy of the most recent installation instructions and product literature for the required products. All accessories required shall be fully described and noted in the bid.

1.6 SUBMITTALS

- A. Product Data.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. All fireplaces and required accessories shall be manufactured and approved by Heat & Glo.

2.2 FIREPLACES

- A. Fireplace Unit
 1. Large Fireplace Unit: SL-550TR w/ Clean Face Kit.
 2. Mantel: Kenwood Flush Mantel SL-750, no raised hearth.
 3. Absolute Black Granite Surround.
 4. Related accessories for complete installation.

2.3 PRODUCT APPROVALS

- A. Fireplace products shall comply with all local building codes and regulations. In addition, products must meet the applicable portions of the following standard:

2.4 OTHER MATERIALS

- A. Other materials not specifically described but required for a complete and proper installation shall be new, best quality of their respective kinds, as selected by the contractor subject to the approval of the architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with the manufacturer's instructions and with the requirements of authorities having jurisdiction, anchoring all components firmly into position for long life under hard use.

3.2 ADJUST AND CLEAN

- A. Adjust and clean for proper operation.

END OF SECTION 10305

SECTION 10425 - SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Panel signs.
- B. Provide signage as indicated on the drawings.

1.3 REFERENCES

- A. ASTM D 790-91 -- Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- B. The Americans with Disabilities Act of 1990 (ADA).

1.4 SUBMITTALS

- A. Product Data: Submit for each type of sign specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Shop drawings:
 - 1. Show fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, layout, reinforcement, accessories, and installation details.
 - 2. Provide message list for each sign required, including large-scale details of wording and lettering layout.
 - 3. For signs supported by or anchored to permanent construction, provide setting drawings, templates, and directions for installation of anchor bolts and other anchors to be installed as a unit of Work in other Sections.
- C. Samples:
 - 1. Submit manufacturer's full range of samples for initial selection of color, pattern, and texture:
 - a. Cast acrylic sheet.

2. Samples for verification of color, pattern, and texture selected:
Submit at least one full size sample for each type of sign specified.
 - a. Include a representative sample of the graphic image process required.
 - b. Show graphic style, and colors and finishes of letters, numbers, and other graphic devices.
 - c. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
 - d. Include each method of attachment.

1.5 QUALITY ASSURANCE

- A. Sign Fabricator Qualifications: Firm experienced in producing signs similar to those indicated for this Project, with a record of successful in-service performance.
 1. For each separate sign type required, obtain signs from a single manufacturer.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where necessary to ensure proper fitting. Show recorded measurements on final shop drawings.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, finishes, and colors of letters, numbers, and other graphic devices.
 1. Signs that designate permanent rooms and spaces and signs that provide direction to or information about functional spaces (and other signs required to comply) shall comply with the Americans with Disabilities Act of 1990.

2.2 MATERIALS

- A. Cast Acrylic Sheet: Cast (not extruded or continuous cast) methyl methacrylate monomer plastic sheet; sizes and thicknesses indicated; minimum flexural strength of 16,000 psi when tested according to ASTM D 790; minimum allowable continuous service temperature of 176 degrees F (80 degrees C).
 1. Colored opaque acrylic sheet.

- B. Wall-Mounted Panel Sign Mountings:
 - 1. Vinyl-tape mounting: Double-sided foam tape for use on smooth, nonporous surfaces.
 - 2. Silicone-adhesive mounting: Liquid silicone adhesive recommended by the sign manufacturer for use on irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended by the sign manufacturer to hold the sign in place until the adhesive has fully cured.
- C. Colored Coatings for Acrylic Plastic Sheet: Use coatings, inks, and paints for copy and background colors that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for the application intended.

2.3 FINISHES

- A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures or other characteristics related to appearance, provide color matches indicated, or if not indicated, as selected by the architect from the manufacturer's standards.

2.4 PANEL SIGNS

- A. General:
 - 1. Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
 - 2. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions.
- B. Frameless Panel Signs: Fabricate signs with edges mechanically and smoothly finished to conform with the following requirements:
 - 1. Edge condition: Square cut.
 - 2. Corner condition: Corners rounded.
- C. Backing: Permanently laminate face panels to backing sheets of material and thickness indicated using the manufacturer's standard process where required by fabricating process or mounting methods, or where otherwise indicated.
- D. Panel Sign Copy Process and Materials:
 - 1. Raised copy: Machine-cut copy characters from matte-finished opaque acrylic sheet and chemically weld onto the acrylic sheet forming sign panel face. Produce precisely formed characters with square cut edges free from burrs and cut marks.

- a. Panel material: Matte-finished clear acrylic with opaque color coating subsurface applied.
- b. Raised copy thickness: 1/16 inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

- 1. Locate sign units and accessories where indicated, using mounting methods of the type described and in compliance with the manufacturer's instructions.
- 2. Install signs level, plumb, and at the height indicated, with sign surfaces free from distortion or other defects in appearance.

B. Wall-Mounted Panel Signs:

- 1. Attach panel signs in accordance with manufacturer's instructions and using mounting methods indicated.

3.2 CLEANING AND PROTECTION

- #### A.
- After installation, clean soiled sign surfaces according to the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END SECTION 10425

SECTION 10522 - FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Work Included:
 - 1. Portable fire extinguishers.
 - 2. Fire extinguisher mounting brackets.

1.3 REFERENCES

- A. Fire Protection Equipment Directory; Underwriters Laboratories Inc. (UL); 1993.
- B. FM P7825 -- Approval Guide 1992; Factory Mutual System; 1992 (with Supplement I).
- C. NFPA 10 -- Standard For Portable Fire Extinguishers; National Fire Protection Association; 1990.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data showing compliance with contract documents.
- B. Certification: Installer shall submit written certification that the fire extinguishers installed comply with the contract documents and are fully and correctly charged.

1.5 QUALITY ASSURANCE

- A. Provide only fire extinguishers which comply with NFPA 10.
- B. Labels: Provide only fire extinguishers which are listed and labeled by Underwriters Laboratories Inc., or Factory Mutual System.

1.6 PROJECT CONDITIONS

- A. Do not deliver or install extinguishers until just before substantial completion.
- B. Do not use permanent fire extinguishers for construction period fire protection.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. Manufacturers: Provide products complying with requirements of contract documents and made by one of the following:
 - 1. Fire extinguishers:
 - a. Walter Kidde, The Fire Extinguisher Co.
 - b. Potter-Roemer.
 - c. Larsen's Manufacturing Company.
- B. Fire Extinguisher FE - 1 :
 - 1. Potter-Roemer Model 3010.
 - 2. Rating: 4A:60B:C
 - 3. Type: Multipurpose dry chemical (ammonium phosphate).
 - a. Stored pressure type.
 - 4. Cabinet mounted and wall mounted.
- C. Identification of Wall-Mounted Fire Extinguishers: Provide manufacturer's standard vinyl decal on wall above extinguisher.
- D. Brackets: Provide wall bracket for each wall-mounted extinguisher.

2.2 CABINETS AND CABINET ACCESSORIES

- A. Manufacturers: Provide products complying with requirements of contract documents and made by one of the following:
 - 1. Cabinets and accessories:
 - a. J.L. Industries.
 - b. Larsen's Manufacturing Company.
 - c. Potter-Roemer Division/Smith Industries, Inc.
- B. Cabinets:
 - 1. Product: Model No. 7020-A-10-VW; Potter-Roemer.
 - a. Provide fire rated cabinets when installed in fire rated walls.

- b. Products of other manufacturers, provided they comply with requirements of contract documents, will be considered for substitution.
- C. Hinges: Provide hinges for each door; concealed or continuous type; allow full 180 degree opening of door.
 - 1. Exposed hinges: Finish to match door.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Perform installation in accordance with the manufacturer's instructions except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
- B. Locate extinguishers as directed by local officials.
- C. Install brackets for wall mounted extinguishers at height necessary to place the top of the extinguisher at 48 inches above finish floor.
- D. Locate cabinets as directed by local officials.
- E. Install so that top of cabinet is 48 inches above finish floor.
- F. Install extinguishers.

3.2 OWNER PERSONNEL INSTRUCTION

- A. Instruct designated personnel of owner in:
 - 1. Operation of extinguishers.
 - 2. Frequency of inspection and maintenance.
 - 3. Procedures for inspection and maintenance.
 - 4. Designation of inspection and maintenance entity.

END OF SECTION 10522

SECTION 10550 - POSTAL SPECIALTIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 DESCRIPTION OF WORK:

- A. Extent of postal specialties is indicated on drawings.
- B. Postal specialties include the following:
 - 1. Front loading 4C mailbox cluster.
 - 2. Directory.
 - 3. Key Keeper.

1.3 QUALITY ASSURANCE:

- A. Manufacturer: Provide products of manufacturers which are approved by U.S. Postal Service when mail system is serviced by USPS.
- B. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for preparation of substrate, installation of anchors, and application of postal specialties units.
- C. Requirements of Regulatory Agencies: Comply with U.S. Postal Service requirements for construction and installation of units serviced by USPS carriers.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data and installation instructions for postal specialties units required.
- B. Provide manufacturer's certification that equipment proposed conforms to U.S. Postal Service regulations and has been approved by the Postmaster General.

- C. Samples: Submit samples, of each color and finish of exposed materials and accessories required for postal specialties.
 - 1. Submit one full-size sample of each type of mail box units.
Acceptable samples may be incorporated in work.
- D. Shop Drawings: Submit shop drawings for fabrication and erection of postal specialties. Include plans, elevations and large scale details. Show anchorages and accessory items. Provide location template drawings for items supported or anchored to permanent construction.

PART 2 – PRODUCTS

2.1 MANUFACTURER:

- A. Subject to compliance with requirements, provide products from the following manufacturer:
 - 1. Auth-Florence Manufacturing.
 - 2. Salisbury Industries

2.2 HORIZONTAL STYLE MAIL BOXES:

- A. General: Auth-Florence 4C Suite F Front Loading Cluster Box Units (CBU) models.
 - 1. Refer to drawings for models, configuration and number of units.
- B. Manufacturer's standard unit, with solid closure and positive latching mechanism.
 - 1. Locking: Construct unit to receive Arrow lock provided by local postmaster for use by letter carrier.
- C. Mail Compartments: Manufacturer's standard unit, heavy metal construction. Finish units as follows:
 - 1. Aluminum: natural anodized finish.
- D. Compartment Doors: Furnish box doors to suit type of frame and loading method.
 - 1. Material: Extruded aluminum.
 - 2. Identification: Provide manufacturer's standard identification labels.
 - 3. Locking: Provide manufacturer's standard locking system that complies with the current US Postal Services requirements. Deliver box keys and master keys to Owner's representative, with record of each corresponding lock and key numbers.

2.3 CLUSTER BOX UNIT:

- A. Provide a total of four 4CFT2-20 cluster units and two 4CFT1-9 unit.
 - 1. Building 1: Two 20 CBUs and one 9 CBU.
 - 2. Building 2: Two 20 CBUs and one 9 CBU.

2.4 KEY KEEPER:

- A. General: Auth-Florence Model KKR with SMKK surface mounted collar.
 - 1. One for each building main entrance door.
 - 2. Finish: Aluminum, natural anodized finish.
 - 3. Coordinate location to be with in reach of entry door lock.

2.5 DIRECTORY:

- A. General: Auth-Florence Directory D400-A.
 - 1. Finish: Aluminum, natural anodized finish.
 - 2. Confirm unit can accommodate more than 44 entries.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install units complying with manufacturer's instructions and final drawings.
- B. Final acceptance will be contingent upon compliance with U.S. Postal Service requirements.

3.2 CLEANING:

- A. Clean units following manufacturer's recommendations.

END OF SECTION 10550

SECTION 10 73 50 – BIKE RACKS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Bicycle Rack for multiple bikes.
 - a. Refer to floor plans for location and quantity.
 - 2. Bike Rack to hang a single bike.
 - a. Provide two per parking space with wall at the head end of parking space except parking spaces with a window in the wall.

1.3 REFERENCES

- A. ASTM A 36 - Standard Specification for Carbon Structural Steel.
- B. ASTM A 123 - Standard Specification for Zinc (hot-dip galvanized) Coatings on Iron and Steel Products.
- C. ASTM A 53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- B. Shop Drawings: Complete details of layout and assembly, showing member sizes and part identification, fasteners, anchors, and fittings.
- C. Selection Samples: Color selections shall be made from the manufacturer's brochure representing manufacturer's full range of available colors and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum of 15 years experience manufacturing site furnishings.
- B. Installer Qualifications: Minimum of 5 years experience assembling and installing site furnishings.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store components off the ground in a dry covered area, protected from adverse weather conditions.

1.7 WARRANTY

- A. The structural integrity of all site furnishings shall be warranted for a period of 5 years from date of delivery against defects in materials and workmanship except for finishes of any kind.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from the following manufacturerS:
 - 1. Bicycle Rake for multiple bikes: Canterbury Designs, Inc.
 - 2. Bike Rack to hang a single bike: Delta Leonardo.

2.2 BYCICLE RAKE FOR MULTIPLE BIKES:

- A. Product.
 - 1. Model: Spiral Modified Bicycle Rack.
 - 2. Size: To accommodate number of bikes noted on plan.
 - 3. Material: Galvanized Steel.
 - 4. Provide fasteners and accessories for complete, secure installation.

2.3 BIKE RACK TO HANG A SINGLE BIKE:

- A. Product.
 - 1. Model: Delta Leonardo Rack with DaVinci Tray.
 - 2. Finish: Manufacturer's standard.
 - 3. Provide fasteners and accessories for complete, secure installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify GC of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

- A. Install complying with manufacturer's instructions and final drawings.
- B. Surface mounting. Locate and drill holes for anchor bolts.

3.3 CLEANING

- A. Clean products following manufacturer's recommendations.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 10800 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Toilet paper dispensers.
 - 2. Combination towel dispenser/waste receptacles.
 - 3. Grab bars.
 - 4. Soap dispensers.
 - 5. Shower curtain rods.
 - 6. Towel bars.
 - 7. Robe hooks.
 - 8. Mirrors.
- B. Related Sections:
 - 1. Ceramic tile bath and shower accessories: Division 9.
 - 2. Wood anchor reinforcement in walls: Division 6.

1.3 SUBMITTALS

- A. Product Data: Written technical information for each accessory specified.
- B. Certificates: Submit certification that work complies with requirements of contract documents.
- C. Qualifications Statements: Submit statements indicating compliance with qualifications requirements specified under "Quality Assurance."

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: A company regularly engaged in manufacture of products specified in this section, whose products have been in satisfactory use, under similar service conditions, for not less than 5 years.

- B. Installer's Qualifications: A company regularly engaged in installation of products specified in this section, with a minimum of 5 years of experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Execute product manufacturer's special instructions to prevent damage to products. Store products in manufacturer's original shipping containers.

1.6 COORDINATION

- A. Use manufacturer's instructions and data to determine anchorage requirements for products specified. In a timely manner, distribute the following to affected installers of related work:
 1. Components and anchorage devices provided by toilet accessory manufacturer for incorporation into other work.
 2. Coordination data including setting drawings, templates, instructions, etc., for cutouts and installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. For each distinct type of toilet accessory, provide accessories fabricated by a single manufacturer.
- B. All model numbers specified are products of Gamco.
- C. Alternate manufacturers: A. J. Washroom Accessories, Inc., American Specialties, Inc, Bobrick and Bray and Krause.

2.2 TOILET ACCESSORIES

- A. Refer to the drawings for all bathroom accessories model numbers.

2.3 SHOWER DOOR AND PANEL

- A. Manufacturer: Century Bathworks, Inc.
- B. Manufactured Units
 1. Configuration: 2'-6" Door and Panel, Frameless.
 2. Height: 6'-8"
 3. Glass: 3/8" Aquatic.
 4. Header: Glasstec Header
 5. Hardware: GAPW-1627, Wall Channel, Stationary, 8" Bow.

6. Hardware Finish: Polished Chrome.

2.4 MEDICINE CABINET

- A. Manufacturer: American Pride Medicine Cabinets
- B. Manufactured Units
 - 1. Model: Harmony 16'x22", ST9926WB.
 - 2. Steel Body with Glass Shelves.
 - 3. Hinge: Piano.
 - 4. Magnetic catch.

2.5 BATHROOM MIRROR

- A. Manufactured Units
 - 1. Polished glass mirror with wood frame to match existing mirror in model unit.
 - 2. Blind mounting to wall.

2.6 MATERIALS

- A. Mounting Devices and Fasteners: Provide toilet accessory manufacturer's recommended items for substrates and conditions indicated.

2.7 FABRICATION

- A. Manufacturer's Trademarks and Model Numbers: Neither name nor trademark of manufacturer is acceptable on exposed surfaces of accessories. Provide manufacturer's name and model number on stamped plate or waterproof label securely affixed to unexposed surface of accessory.
- B. Surface Mounted Accessories: Where possible, design accessory to provide concealed anchorage when installed. Precisely-fit seams and joints. Roll exposed edges unless indicated otherwise. Use full-length stainless steel piano-type hinges for access doors and panels.
- C. Recess Mounted Accessories: Design accessories to provide concealed anchorage when closed. Weld all joints. Precisely miter corners where indicated. Use full-length stainless steel piano-type hinges for access doors and panels.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to ensure proper operation and servicing of accessories. Notify the architect in writing of any conflicts concerning product placement, for resolution. Do not proceed without resolution.
- B. Correct unsatisfactory substrate conditions before start of accessory installation.

3.2 PREPARATION

- A. Clean surfaces to receive accessories. Protect surrounding elements from damage during accessory installation.

3.3 INSTALLATION

- A. Perform installation in accordance with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
- B. Provide plumb, level accessory installations.
- C. Securely attach accessories to substrate.
- D. Accessories Installed for Use by Handicapped Persons: Install as indicated on drawings.

3.4 ADJUSTING

- A. Adjust accessories as required to provide smooth operation and trouble free servicing.

3.5 CLEANING

- A. Clean and polish exposed surfaces of accessories using accessory manufacturer's recommended procedures and cleaning agents.

3.6 PROTECTION

- A. Provide coverings as required to protect installed accessories.

END OF SECTION 10800

DIVISION II
Equipment



SECTION 11452 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Residential Appliances including:
 - a. Ranges
 - b. Refrigerator
 - c. Hoods
 - d. Garbage Disposals
 - e. Washers
 - f. Dryers
 - g. Microwave

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, installation instructions, and general recommendations for each major product required. Include data substantiating that products to be furnished comply with requirements of the contract documents.
- B. Operation and Maintenance Data: Submit material suitable for inclusion in manuals. Include operating and maintenance instruction, parts inventory listing, purchase source listing, emergency instructions, and similar information.
- C. Maintenance Data: Submit manufacturer's instructions for proper maintenance materials and procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain required products from a single manufacturer.
 - 1. Accessories: Provide accessory items only as produced or recommended by manufacturer of primary products.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and against contact with damp or wet surfaces.
- B. Delivery and Storage: Protect materials from excessive moisture in shipment, storage, and handling. Deliver materials in manufacturer's unopened packages, and store in dry place with adequate air circulation.

PART 2 - PRODUCTS

2.1 RESIDENTIAL APPLIANCES:

- A. The design is based on the following product: As scheduled on the drawings.
 - 1. Colors:
 - a. As noted on drawings, but if color is not indicated then as selected by the Owner manufacturer's standard selection.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's instructions, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.

3.2 ADJUSTING

- A. Final Adjustments: Upon achieving substantial completion of the work, adjust all operable components to ensure that they are properly installed and functioning smoothly. Replace any component which cannot be adjusted for proper operation.

3.3 CLEANING

- A. Upon completion, clean all surfaces which have become soiled or coated as a result of work of this section, using proper methods which will not scratch or otherwise damage finished surfaces.
 - 1. For cleaning, use only products and techniques acceptable to manufacturer of products being cleaned.

3.4 PROTECTION

- A. General: Institute protective procedures and install protective materials as required to ensure that work of this section will be without damage or deterioration at substantial completion.

END OF SECTION

SECTION 11458 – ROOF HATCH AND LADDER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Roof hatch with integral curbs.
- B. Fixed ladder and brackets.
- C. Products Required, But Not Supplied Under This Section.
 - 1. Required fasteners.

1.3 SYSTEM DESCRIPTION

- A. The system is an aluminum ladder designed to be attached to a wall.
- B. The system requires a ceiling opening of 2'-6" X 4'-6" (30" X 54") for floor to ceiling dimensions up to 10'-0' and a ceiling to upper floor dimension of greater than 1'. The rough opening at the level above shall be 30" x 76 1/2".

1.4 DELIVERY, STORAGE AND HANDLING

- A. Examine units when they arrive on site. Notify the carrier and manufacturer of any damage.
- B. Store units until installation under roof, if possible; or, if stored outside, under a tarp or suitable cover.

1.5 WARRANTY

- A. The units carry a limited warranty of 1 year against defective material and workmanship, covering parts only, no labor or freight. Defective parts, if deemed so by the manufacturer, will be replaced no charge, freight excluded, upon inspection at manufacturer's plant which warrants same.

1.6 MAINTENANCE

- A. Under normal usage, the units shall require no preventive maintenance.
- B. No spare parts shall be required.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Precision Ladders, LLC, P. O. Box 2279 - Morristown, Tennessee 37816-2279. Phone: (800)225-7814. FAX: (423)586-2091.

2.2 ROOF HATCH

A. CURB

1. Formed from 14 gauge galvanized steel of lockforming quality per ASTM A-525 with G90 coating (.090 Aluminum H-14 3003 on aluminum models).
2. Sheathed with 1" of rigid fiber board insulation.
3. Height of 12" unless indicated otherwise on drawings.
4. 4" integral flange for securing to roof.
5. Hinges connecting curb to door shall be 1/8", 2 piece formed steel with 3/8" pivot pin.
6. Extruded rubber gasket within a 20 gauge extruded aluminum track shall be securely attached to the frame to make the unit weathertight.

B. COVER

1. Formed from 14 gauge galvanized steel of lockforming quality per ASTM A-525 with G90 coating (.090 Aluminum H-14 3003 on aluminum models).
2. Liner shall be 22 gauge galvanized steel with G90 coating (.040 Aluminum H-14 3003 on aluminum models).
3. Insulation between cover and liner to be 1" thick U.L. plain fiberglass 0.75# density.
4. Lid shall be reinforced as required with 11 ga. steel channel.
5. A one point cab lock is to be provided with a built-in inside handle on units with a length of 4' 6" or less.
6. On units of greater length, a 2 point slam lock will be used.
7. Exterior of cover shall be devoid of hardware with the exception of the outside handle.
8. Outside handle shall be vinyl coated, steel T-handle.

9. Automatic hold-open device shall be formed from 3/16" steel flat bar and 1/2" diameter steel round stock with a vinyl grip.
10. Padlock provisions provided on both interior and exterior of unit.

C. PRESSURE CONTROL

1. Opening/closing assistance/resistance on all models shall be provided with pressure intensifiers consisting of a telescoping tube; the top(outer) tube shall be 1 5/16",
 - a. bottom(inner) tube shall be 1 1/2".
2. Tubes shall be cadmium plated and chromate-sealed.

D. HARDWARE

1. Corrosion resistant hardware and fasteners is standard.

E. MANUFACTURED UNITS

1. The roof is a Model PLH-G 3'-0" x 3'-0"

F. FABRICATION

1. The hatch is completely fabricated ready for installation before shipment to the site.

G. FINISH

1. Red oxide primer.

H. SOURCE QUALITY CONTROL

1. All products inspected at factory in an ISO 9002 environment.
2. All products tested in factory for proper operation before shipment.

2.3 LADDER

A. Ladder

1. Stringers (Siderail)
2. Aluminum channel. (6005-t5)
3. 2 1/2" X 1 1/16" X 1/8" .
4. A 1/8" molded polyurethane safety cap provided at top.
5. 2 1/2" X 2" X 3" floor bracket if required.

B. Treads

1. Extruded aluminum (6005-t5)
2. 2 1/4" X 3/4" X 1/4".
3. Treads deeply serrated for safety.

C. Mounting Bracket

1. 8" X 2" X 3" X 1/4" aluminum angle.

D. FRAME

1. Custom fabricated from 1/8" steel with factory-installed tread(s) to cover the distance from finished ceiling to finished floor above. Frame shall be on a 63 degree angle on the hinge end in order to continue the climb from ceiling and beyond on the same incline as the folding portion of the unit. The frame shall have pre-drilled and mounted brackets to allow for hanging from and fastening to the floor above.

E. HARDWARE

1. Steel blade type hinge connecting stringer sections, zinc-plated and chromate-sealed, bolted to stringers.
2. Steel operating arms, both sides, zinc-plated & chromate-sealed.
3. Double acting steel springs and V-hooks, both sides.
4. Rivets rating at 1100# shear.

F. SAFETY

1. Steel bar handrail riveted to stringers, upper section, right side standard. Other locations optional
2. Steel section alignment clips at stringer section joints.
3. Molded rubber guards at corners of aluminum door panel.

G. MANUFACTURED UNITS

1. The fixed vertical ladder is a Model FL14.

H. FABRICATION

1. The ladder is completely fabricated ready for installation before shipment to the site.

I. FINISHES

1. Mill finish on aluminum stairway components.

J. SOURCE QUALITY CONTROL

1. All products tested in factory test jig for proper operation before shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine rough opening in ceiling for opening size and squareness.

3.2 INSTALLATION

- A. Install per the manufacturer's installation instructions.

3.3 FIELD QUALITY CONTROL

- A. The manufacturer has representatives in all areas of the United States and Canada. For the name of the closest representative, call (800)225-7814.

END OF SECTION

DIVISION 12 Furnishings



SECTION 12372 – CABINETS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes:
 - 1. Kitchen cabinets
 - 2. Bathroom cabinets
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 6 Section for countertops.
 - 2. Division 11 Section for appliances mounted in kitchen casework.
 - 3. Division 15 Section for sink units mounted in countertops.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of casework specified.
- C. Shop drawings showing location and size of each type of casework, accessories, materials, finishes, hardware types and locations, filler panels, and anchorage details. Include fully dimensioned plans and elevations and anchorage details to countertop and walls.
- D. Samples for selection purposes for each color, texture, and pattern specified, showing full range of variations expected in these characteristics.
 - 1. Frame, drawer and door panel for finish selection.
 - 2. One unit of each type of exposed hardware required.
- E. Product certificates signed by the manufacturer certifying that materials furnished comply with specified requirements.

- F. Maintenance data for kitchen casework for inclusion in Maintenance Manual specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Kitchen and Bathroom Casework: Complying with ANSI/NKCA A161.1.
 - 1. KCMA Certification: Provide kitchen and bathroom casework with National Kitchen Cabinet Manufacturers Association "Certified Cabinet" seal affixed in a semi-concealed location of each unit, evidencing compliance with above standard.
- B. Single-Source Responsibility: Obtain kitchen and bathroom casework from one source from a single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver casework as a factory-assembled unit, packaged individually, and shipped each in its own carton.

1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Comply with casework manufacturer's written requirements for temperature and humidity conditions during storage and installation. Do not install casework until these conditions have been attained and stabilized.
- B. Field Measurements: Verify casework dimensions by field measurements. Verify that kitchen casework may be installed in compliance with the original design.

PART 2 – PRODUCTS

2.1 CABINETS

- A. Manufacturer: New England Cabinetry.
- B. Kitchen Cabinets
 - 1. Base with Honed Absolute Black Granite: Shaker panel full overlay, white.
 - 2. Option 1 with Carrara Marble, Bianco: Dark Cherry, Euro Style Full overlay.
 - 3. Option 2 with Green Soapstone: Light Cherry, Euro Style Full overlay.
 - 4. Match cabinet and door configurations on drawings.
 - 5. All interior shelving to be adjustable.

6. All pantry cabinets to have roll out shelves.

C. Bathroom Cabinets

1. Base with Carrara Marble, Bianco: Dark Cherry, Euro Style Full overlay.
2. Option 1 with Honed Absolute Black Granite: Shaker panel full overlay, white.
3. Option 2 with Green Soapstone: Light Cherry, Euro Style Full overlay.
4. Match cabinet and door configurations on drawings.
5. All interior shelving to be adjustable.

D. General Materials

1. Particle Board: ANSI A208.1 mat-formed particle board, Grade 1-M-2 with minimum density of 40 pcf, internal bond of 60 psi, and minimum screw-holding capacity of 225 lbs. on faces and 200 lbs. on edges.
2. Hardwood Plywood: ANSI/HPMA HP hardwood and decorative plywood, Good Grade (1) or better.
3. Hardboard: ANSI A135.4, Class 1, tempered.

2.2 CABINET HARDWARE

1. Kitchen pulls: Amerock AMBP19007-SS.
2. Bathroom knobs: Amerock AMBP19010-SS.
3. Hinges: Adjustable to allow for cabinet door adjustment in all directions.
4. Heavy duty drawer slides that allow for full access of drawer.

2.3 ACCESSORIES

- A. General: Manufacturer's standard accessories of type indicated.
- B. Adhesive as recommended by manufacturer. If adhesive is not recommended provide PL400 construction adhesive or liquid nail type product.

2.4 FABRICATION

- A. Fabricate wood kitchen casework to dimensions and profiles and details indicated.
- B. Assemble units in shop in components as large as practicable to minimize field cutting and jointing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cabinets plumb, level, true, and straight with no distortions using concealed shims. Where wood cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings as indicated or required and in finish to match cabinet face.
- B. Anchor cabinets securely in place with concealed fasteners, anchored into structural support members of wall construction. Comply with manufacturer's instructions for support of units.
- C. Complete hardware installation and adjust doors and drawers for proper operation, fit and orientation.

END OF SECTION 12372

SECTION 12690 - FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. This Section includes:
 - 1. Surface-type Floor Mats:
 - a. Vinyl Aluminum Link-Type Mats
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 9 Section for tile flooring and transition strips.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of floor mat and frame specified, including manufacturer's specifications and installation instructions, details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- C. Shop drawings showing layout and types of floor mat and frames, full-scale sections of typical installations, details of patterns or designs, anchors, and accessories.
- D. Samples for initial selection purposes in form of manufacturer's color charts consisting of actual sections of floor mat and frame materials, showing full range of colors, textures, finishes, and patterns available, for each type of floor mat and frame indicated.
- E. Samples for verification purposes in form of 12-inch-square assembled section of floor mat and frame members with selected tread surface showing each type of metal finish and color of exposed floor mat, frames, and accessories required. Where finishes involve normal color and texture variations, include sample sets showing full range of variations expected.

- F. Maintenance data in form of manufacturer's printed instructions for cleaning and maintaining floor mats.

1.4 PROJECT CONDITIONS

- A. Field Measurements: Check actual blocked-out openings in floors by accurate field measurements before fabrication of frames and mats; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of Work.

1.5 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain floor mats and frames from one source from a single manufacturer.

1.6 SEQUENCING AND SCHEDULING

- A. Provide recesses in tile work to receive mat. Defer mat installations until building enclosure is completed and related interior finish work is in progress.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Reese Enterprises, Inc.

2.2 MATERIALS

- A. General: Provide colors, patterns, and profiles of materials, including metals and metal finishes, as indicated on drawings or by this specification or, where not indicated, as selected by Architect from manufacturer's standard colors, patterns, and profiles.
- B. Roll-Up-Type Aluminum Floor Mats: Provide manufacturer's standard extruded aluminum hinged tread-slat mat system, with slotted hinges to form 2-inch-wide by 3/8-inch-thick slat modules, with top-surface tread inserts, continuous vinyl cushions on bottom surface of slats, and vinyl transition strip. Provide type of tread inserts and aluminum finish as specified below.
 1. Tread Surface: Textured-surface resilient vinyl insert.

2. Flexible Surface-Type Applications: Where floor mat is indicated for surface application (recessed in tile floor), provide standard vinyl transition strip, with receiver at all 4 edges, with mitered corner construction. See floor finish specifications for model.

2.3 FABRICATION

- A. Shop fabricate units of floor mat work to greatest extent possible in sizes as indicated. Where not otherwise indicated, provide single unit for each mat installation, but do not exceed manufacturer's maximum size recommendation for units intended for removal and cleaning. Where joints in mats are necessary, space symmetrically and away from normal traffic lanes. Where possible, verify sizes by field measurement before shop fabrication.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install mats to comply with manufacturer's instructions, at locations indicated and with top of mats in proper relationship to one another and to adjoining finished flooring. Set mat tops at height recommended by manufacturer for most effective cleaning action; coordinate top of mat surfaces with doors that swing across mats to provide underdoor clearance.

3.2 PROTECTION

- A. Provide and maintain protection until construction traffic has ended and project is near time of Substantial Completion.
- B. Defer installation of floor mats until near time of Substantial Completion for project.

END OF SECTION 12690

DIVISION 14
Conveying Systems



SECTION 14245 - HYDRAULIC PASSENGER ELEVATORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract from the front of the Specification book, including General Conditions and Supplementary General Conditions, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Elevator and related equipment.
 - 2. As part of elevator work include 16 hours of elevator operation time to accommodate work of other trades related to the elevator and its hoistway.
- B. Elevator machinery.
 - 1. Elevator machinery.
 - 2. Control system and signal equipment.
 - 3. Elevator car finishes.
 - 4. Hoistway entrances.
 - 5. Guides and safety equipment.
 - 6. Testing and inspection of elevator systems.
 - 7. Maintenance service.
 - 8. Pit ladders.
- C. Related Sections:
 - 1. Concrete work, including setting of inserts: Division 3.
 - 2. Grout solid hoistway door frames in masonry walls: Division 4.
 - 3. Rough sills at hoistway entrances: Division 5.
 - 4. Fully fill hoistway door frames with drywall in framed walls: Division 9.
 - 5. Heating, ventilating, and cooling of machine rooms: Division 15.
 - 6. Electrical power to machine room: Division 16.
 - 7. Telephone service or intercom connection to hoistway for each car: Division 16.
 - 8. Fire alarm system: Division 16.

1.3 REFERENCES

- A. ANSI A117.1-1986 -- American National Standard for Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People; 1986.
- B. ASME A17.1b-2000 -- Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers.
- C. ASTM A 366/A 366M-91 -- Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality; 1991.
- D. NEMA LD 3-1991 -- High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 1991.
- E. NFPA 70 -- National Electrical Code; National Fire Protection Association; 1993.
- F. NFPA 80 -- Standard for Fire Doors and Windows; National Fire Protection Association; 1992 (with Errata dated October 6, 1992).

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's published data for each principal component or product, including but not limited to the following:
 - 1. Signal and operating fixtures, panels, and indicators.
 - 2. Car construction and finishes.
 - 3. Doors and frames.
 - 4. Control equipment.
- B. Shop Drawings: Incorporate the information necessary for proper fabrication and installation of the elevator system, including but not limited to the following:
 - 1. Location of machines and control components; include required clearances for access and service.
 - 2. Location, size, and required clearances for hoistway components including car, guide rails, traveling cables, and buffers.
 - 3. Rail bracket spacing, and maximum loads on guide rails.
 - 4. Reactions at points of support.
 - 5. Location of electrical and communication service connections, with indication of limits of elevator installer's work.
 - 6. Description of controls and operational features.
 - 7. Average and peak hourly heat dissipation requirements for elevator equipment in machine room.

- C. Samples:
 - 1. Car finishes: 6- to 8-inch-square samples of sheet materials and 10- to 12-inch-long samples of linear materials to be exposed in finished car.
 - 2. Hoistway doors and frames: 6- to 8-inch-square samples of exposed materials.
 - 3. Car doors: 6- to 8-inch-square samples of exposed materials.
 - 4. Signal fixtures: Samples of exposed materials or actual fixtures.
 - a. Approved sample fixtures may be incorporated into the work.
- D. Maintenance Manuals: Include operating instructions, maintenance data, list of parts, recommended parts inventory, purchase sources for parts, emergency procedures, and similar data.
- E. Permits and Certificates: Secure and deliver to owner those permits and certificates required by governing authorities to allow normal operation of each elevator.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Safety code: Comply with requirements of ASME A17.1, and with any more stringent requirements of governing authorities.
 - 2. NFPA: Comply with all applicable NFPA codes and standards.
 - 3. Handicapped accessibility: Comply with the requirements of ANSI A117.1.
 - 4. Fire resistance: Comply with provisions of NFPA 80 for hoistway entrances. Provide doors and frames bearing labels of agency acceptable to governing authority, and including 30-minute temperature rise rating.
 - 5. Americans with Disabilities Act or Code for the disabled of the state that the project is located.
 - 6. Elevator Code of the state that the project is located.
- B. Manufacturer Qualifications: Minimum of 10 years' successful experience in the design, fabrication, and installation of elevator systems comparable in size and nature to that required for this project.
- C. Installer: The elevator manufacturer or an installer approved by the manufacturer who has not less than 5 years' experience in the installation of comparable elevator systems.

1.6 WARRANTY

- A. Elevator System Warranty: Submit a written warranty, signed by the contractor and the installer, guaranteeing to correct failures in elevator system which occur within warranty period, without reducing or otherwise limiting any other rights to correction which the owner may have under the contract documents.
 - 1. Failures are defined to include faulty workmanship, excessive wear, operation system or control system failures, sub-standard performance, excessive noise or vibration, and similar unsafe or unsatisfactory conditions.
 - 2. Damage or failures due to abuse, misuse, vandalism, accidents, or neglect caused by persons other than the installer's personnel may be excluded from the warranty.
 - 3. Warranty period is 12 months from date of substantial completion of the project or written acceptance of the completed elevator..

1.7 MAINTENANCE

- A. Full Maintenance Service: Provide complete maintenance service by installer, including standard monthly preventive maintenance. Repair or replace worn equipment, and include normal lubrication, cleaning, and adjustment as recommended by manufacturer of elevator system components.
 - 1. Include complete emergency service, on an around-the-clock basis every day.
 - 2. Initial maintenance period is 12 months, starting on date of substantial completion or written acceptance of the completed elevator.
- B. Maintenance Service Proposal: Submit proposal to provide continuing service for each elevator as specified above for a period of 24 months following expiration of initial maintenance period. This quote to be presented to the Owner along with the total project costs.

PART 2 - PRODUCTS

2.1 ELEVATOR SCHEDULE

- A. Elevator Type. See drawings for number and locations. Items below apply to each elevator shown:
 - 1. Type: Passenger, In Ground Direct Plunger.
 - 2. Rated capacity: 3500 pounds.
 - 3. Rated speed: 125 feet per minute.

4. Travel distances: See Drawings.
5. Landings served: See Drawings.
6. Machine: Hydraulic.
7. Operation control system: Selective collective.
8. Signal equipment:
 - a. Number of hall call stations: One at each floor.
 - b. Hall position indicators: Provide digital display type at main floor.
 - c. Style of hall call stations: Manufacturer's standard with stainless steel faceplates.
 - d. Hall lanterns: Manufacturer's standard design.
 - e. Car control panels:
 - (1) Provide one per car.
 - (2) Style: Manufacturer's standard.
 - f. Car position indicator: Digital display, mounted in each car control panel.
9. Car enclosure:
 - a. Wall finishes: Plastic Laminate.
 - b. Floor finishes: VCT from common areas
 - c. Ventilating fan: Single speed.
10. Car doors: Hollow metal.
 - a. Finish: No. 4 brushed stainless steel.
11. Hoistway entrances:
 - a. Type: Side opening, single speed.
 - b. Size: Manufacturer's standard.
 - c. Finish - typical all floors: Baked enamel.
12. Accessories:
 - a. Provide pad hooks in each car.
 - b. Provide protective pads.
 - c. Provide inspection certificate frame.
 - d. Provide telephone handset cabinet.
 - e. Provide auto dialer telephone, coordinate with fire department requirements.
 - f. If the project is located in Massachusetts the Massachusetts Medical Emergency Provisions shall be provided.
 - g. Seismic Zone (2) Requirements shall be provided.
 - h. Provide Battery operated emergency power lowering device.
 - i. Provide independent service.
 - j. Provide elevator pit ladder.
 - k. Provide water tight plunger collar.
 - l. If building is located in a flood plane provide flood resistant material and components up to the flood plane level.
 - m. If building is located in a flood plane provide a flood control device, at the bottom level, that in the event of flooding it will return the elevator cab to floor level above flood plane.

- n. Provide additional requirements as may be required by the state in which the project is located.
13. Provide non proprietary components so that 3 or more elevator maintenance contractors will be able to maintain the elevator.

2.2 MANUFACTURER

- A. Elevator Systems:
 - 1. Manufacturer - elevator system: Provide products complying with requirements of the contract documents and made by one of the following:
 - a. ThyssenKrupp Elevator.
 - b. Otis Elevator Company.
 - 2. Manufacturer - passenger elevator cars: Provide products complying with requirements of the contract documents and made by one of the following:
 - a. Manufacturer of elevator system.

2.3 ELEVATOR MACHINES AND EQUIPMENT

- A. Hydraulic Machines:
 - 1. Pump: Positive displacement; 10 percent maximum allowable output variation between no load and full load output volume.
 - 2. Motor/pump coupling: Direct; submersible pump unit.
 - 3. Motor: Single speed ac.
 - a. Motor starting: Solid State.
 - 4. Provide acoustical spring isolators between pump and motor unit and building structure.
 - 5. Oil control unit: Mount the following items to provide access for adjustment without disconnecting oil lines:
 - a. Relief valve.
 - b. Up start and stop valve.
 - c. Check valve.
 - d. Lowering valve.
 - e. Leveling valve.
- B. Provide rails, brackets, and anchorage devices sized to resist loads and safety factors stipulated by the elevator code.
- C. Buffers: Provide buffers designed to accommodate elevators of speed and capacity indicated.

2.4 HOISTWAY ENTRANCES

- A. Hollow Steel Doors: Flush-welded, hollow-metal construction, fabricated from ASTM A 366 cold-rolled, commercial quality, stretcher-leveled steel sheet.
 - 1. Baked enamel finish: Factory-applied, baked synthetic enamel over rust-inhibiting primer.
 - 2. Color: Selected by the architect from manufacturer's standard selection.
- B. Door Frames: Bolted hollow metal; finish to match doors.
- C. Threshold: Extruded aluminum; mill finish.

2.5 ELEVATOR CARS

- A. Frame: Fabricated from structural steel shapes, braced, and mounted with resilient isolators.
- B. Doors: Flush-welded hollow-metal construction, fabricated from ASTM A 366 cold-rolled, commercial quality, stretcher-leveled steel sheet.
 - 1. No. 4 brushed stainless steel finish.
- C. Door Operating Equipment:
 - 1. Operator: Heavy duty dc motor.
 - 2. Door guides and track: Polyurethane wheels with ball-bearing or roller-bearing hubs in adjustable formed steel track.
 - 3. Door edge protection: Leading edge equipped with retractable rubber bumper which causes door to reopen upon contact with obstruction.
 - 4. Door protective and reopening device: Comply with the requirements of ANSI A117.1.
 - a. Type: Photocell.
- D. Door Frames: Manufacturer's standard design; finish to match car doors.
- E. Threshold: Match typical floor hoistway entrance threshold.
- F. Lighting: Fluorescent.
- G. Ceiling:
 - 1. Translucent polycarbonate panels mounted in a black metal frame.

- H. Walls:
 - 1. Finish:
 - a. Flush Wood Core Walls faced in Plastic laminate.
- I. Floor:
 - 1. Rough floor: Provide 1 layers of 5/8-inch-thick, fire-retardant treated plywood underlayment, recessed below top of threshold to accommodate indicated floor finish.
 - 2. Floor finish: Resilient tile flooring.
 - a. Flooring type: As specified in Division 9.
- J. Base: Stainless steel, No. 4 brushed finish, surface applied.
- K. Handrail: Cylindrical stainless steel on rear wall at front opening elevators and each side wall at front and rear opening elevators.

2.6 OPERATION CONTROL SYSTEMS

- A. General: Provide operation control system with features of operation as defined by the elevator code and as specified.
- B. Selective Collective Operation: Solid state control unit, functions in accordance with ASME A17.1. Relay or vacuum tube systems not acceptable.

2.7 ELECTRICAL COMPONENTS

- A. General:
 - 1. Comply with the requirements of NFPA 70 (National Electrical Code).
 - 2. Provide units with Underwriters Laboratories labels of electrical safety for components which are accessible to persons other than elevator maintenance personnel.

2.8 LUBRICATION

- A. Grease Fittings:
 - 1. Provide at all bearings requiring periodic lubrication.
 - 2. Grease cups: Automatic feed compression type.
 - 3. Lubrication points: Visible and easily accessible.

2.9 SIGNAL EQUIPMENT

- A. Hall Call Stations: Provide illuminated buttons.

- B. Hall Lanterns:
 - 1. Provide two-tone gong; single tone indicates up car, two tones indicates down car.

- C. Hall Position Indicators: Provide display that shows car's position (nearest landing). Locate at the main floor.
 - 1. Digital display type: Manufacturer's Standard.
 - 2. Faceplate: Stainless steel; brushed finish.
 - 3. Combine hall lantern with the position indicator.

- D. Car Control Stations: Manufacturer's standard swing type with the following minimum features:
 - 1. Illuminated call button for each landing served.
 - 2. Door open button.
 - 3. Door close button.
 - 4. Emergency stop switch.
 - 5. Alarm button.
 - 6. Manufacturer's Standard car position indicator.
 - 7. Telephone: Integral with the car station or return panel.
 - 8. Mount the following devices in the car operating panel above the push buttons:
 - a. Fan switch.
 - b. Light switch.
 - c. Independent service switch.
 - 9. Provide audible tone as car passes each landing.

- E. Car Position Indicators: Display to show present or next landing.
 - 1. Manufacturer's Standard Design.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that the following are of proper size and type to receive elevator system:
 - 1. Hoistway; including pit, overrun, shaft enclosure, and hoistway openings.
 - 2. Machine room; including machine supports, ventilation, and access.
 - 3. Electrical work; including communication wiring, electrical power, and circuit protection.

- B. Report conditions detrimental to proper and timely completion of elevator work in writing.

3.2 PREPARATION

- A. Furnish anchors, inserts, and similar materials which are to be installed as work of other sections to the entities performing the work. Include setting drawings or templates as required to ensure accurate placement.

3.3 INSTALLATION

- A. General: Except where exceeded by other requirements, comply with manufacturer's installation instructions and recommendations.
- B. Coordination: Carefully schedule work of this section with respect to other work under the contract documents, to avoid delays in construction.
- C. Plunger-Cylinder: Install unit properly centered under car, anchor securely in place, and make all necessary connections.
 - 1. Install water tight collar.
- D. Lay out and install work to facilitate access for maintenance, lubrication, and repair.
 - 1. Arrange equipment having rotating shafts, armatures, or sheaves in a manner to allow removal of moving components for repair without dismantling or removing other equipment components.
- E. Install rotating and vibrating elevator equipment and components on vibration-attenuating mounts.
- F. Install guide rail brackets and guide rails to allow accurate alignment, expansion, and realignment of guide rails after completion of installation.
- G. Install hoistway entrance components in hoistway walls.
 - 1. Set entrances in vertical alignment with car openings and in correct relationship to guide rails.
 - 2. Set hoistway door sills in correct relationship to finish floor.
- H. Welding:
 - 1. Use welders and welding processes qualified for type of weld and type of equipment required.
 - 2. Clean welds and adjacent metal, removing slag, oxidation, and other residues by wire brushing or other acceptable means. Apply 2 coats of rust-inhibitive primer.
- I. Adjust equipment for smooth and quiet operation.

3.4 TOLERANCES

- A. Guide Rail Alignment: Plumb and parallel within 1/8 inch in 12 feet, not to exceed 1/4 inch overall.
- B. Automatic Leveling at Landing: Plus or minus 1/4 inch within 3 seconds after initial stop; but not more than 1.5 seconds after door is fully open, regardless of load and direction of travel.

3.5 FIELD QUALITY CONTROL

- A. Notice Requirements: Provide 2 weeks' written notice of date and time of tests.
- B. Acceptance Testing: Perform tests required by ASME A17.1 and governing authorities before placing elevator in service.
 - 1. Deliver certificates and permits to the owner.

3.6 PROTECTION AND CLEANING

- A. Protect exposed finished surfaces from time of installation until acceptance of elevator system by the owner.
- B. Upon acceptance by the owner, or when directed by the architect, remove protection and clean exposed finished surfaces.
 - 1. Repair or replace damaged surfaces and components.

3.7 DEMONSTRATION

- A. Instruction of owner's Personnel:
 - 1. Provide instruction of designated personnel in proper use, operation, and daily maintenance of elevators.
 - 2. Review emergency provisions, including the following:
 - a. Emergency access in event of operation failure.
 - b. Restoration of normal service after emergency operation.
- B. Demonstration: Make a final check of each elevator operation, with the owner's personnel present, just prior to date of acceptance. Determine that control systems and operating devices are functioning properly.

END OF SECTION 14245

