tma architect, p.a.

post office box 39355
Greensboro, NC 27438
336.282.7171

ACE *Solutions,* Inc.
P.O. Box 935
950 Graves Street, Suite C
Kernersville, North Carolina 27285-0935

Facility for

Community Based Outpatient Clinic
Jacksonsville, NC

Department of Veterans Affairs

Specifications

100% Set

8/30/2013

Construction Managers, Inc.

Design-Build Management

Fremont, NC www.constructman.com 919.242.4600

CIVIL DESIGN IS BY SELECTED DEVELOPER'S CONSULTANT.

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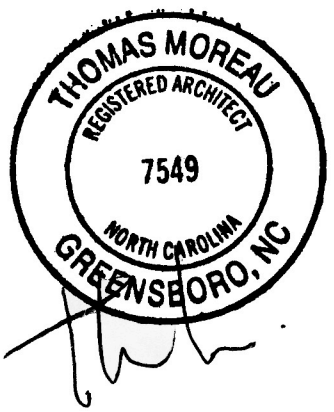

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Kernersville, North Carolina 27285-0935
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336-993-5114

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SECTION 007200 – GENERAL CONDITIONS

PART 1 – GENERAL

1.1 SUMMARY

A. AIA Document A201-2007 General Conditions of the Contract for Construction is part of the Contract as if it included here in its entirety.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 007200

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. Project: Community Based Outpatient Clinic

B. Owner: Department of Veterans Affairs

C. Architect: tma architect, p.a., Greensboro, NC

D. The Work consists of:

E. VA- and Tenant-Furnished Items: The following products will be furnished by VA and the tenant and shall be installed by Contractor as part of the Work:

1. SEE DRAWINGS FOR DESCRIPTION.

F. Work Under Other Contracts:

1 Civil Design is by selected developer's consultant.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011000

SECTION 014529 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained and paid for by Contractor.

1.2 APPLICABLE PUBLICATIONS:

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

B. American Association of State Highway and Transportation Officials (AASHTO):

T27-06 ..... Sieve Analysis of Fine and Coarse Aggregates
T96-02 (R2006) ..... Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
T99-01 (R2004) ..... The Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
T104-99 (R2003) Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
T180-01 (R2004) ..... Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop T191-02(R2006) ..... Density of Soil In-Place by the Sand-Cone Method

C. American Concrete Institute (ACI): 506.4R-94 (R2004) ... Guide for the Evaluation of Shotcrete

D. American Society for Testing and Materials (ASTM):

A325-06 ..... Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
A370-07 ..... Definitions for Mechanical Testing of Steel Products
A416/A416M-06 ..... Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
A490-06 ..... Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
C31/C31M-06 ..... Making and Curing Concrete Test Specimens in the Field
C33-03 ..... Concrete Aggregates
C39/C39M-05 ..... Compressive Strength of Cylindrical Concrete Specimens
C109/C109M-05 ..... Compressive Strength of Hydraulic Cement Mortars
C138-07 ..... Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
C140-07 ..... Sampling and Testing Concrete Masonry Units and Related Units
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C173-07 ..... Air Content of freshly Mixed Concrete by the Volumetric Method

C330-05.....Lightweight Aggregates for Structural Concrete
C567-05.....Density Structural Lightweight Concrete
C780-07 .....Pre-construction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
C1019-08 .....Sampling and Testing Grout
C1064/C1064M-05 .....Freshly Mixed Portland Cement Concrete
C1077-06 .....Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
C1314-07 ..... Compressive Strength of Masonry Prisms
D698-07 .....Laboratory Compaction Characteristics of Soil Using Standard Effort
D1143-07.....Piles Under Static Axial Compressive Load
D1188-07 ..... Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens D1556-07 .....Density and Unit Weight of Soil in Place by the Sand-Cone Method
D1557-07 ..... Laboratory Compaction Characteristics of Soil Using Modified Effort
D2166-06 .....Unconfined Compressive Strength of Cohesive Soil
D2167-94(R2001).....Density and Unit Weight of Soil in Place by the Rubber Balloon Method
D2216-05 .....Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
D2922-05.....Density of soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
D2974-07.....Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
D3666-(2002).....Minimum Requirements for Agencies Testing and Inspection Bituminous Paving Materials D3740-07Minimum Requirements for Agencies Engaged in the Testing and Inspecting Road and Paving Material
E94-04 ..... Radiographic Testing
E164-03 .....Ultrasonic Contact Examination of Weldments
E329-07.....Agencies Engaged in Construction Inspection and/or Testing
E543-06.....Agencies Performing Non-Destructive Testing
E605-93(R2006).....Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members
E709-(2001).....Guide for Magnetic Particle Examination
E1155-96(R2008) ..... Determining FF Floor Flatness and FL Floor Levelness Numbers

E. American Welding Society (AWS): D1.1-07..... Structural Welding Code-Steel

13 REQUIREMENTS:

A. Accreditation Requirements: Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (i.e.; E 329, C 1077, D 3666, D3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing

shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the "Corporate Office."

B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by COTR or authorized VA representative. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of COTR or authorized VA representative to such failure.

C. Written Reports: Testing laboratory shall submit test reports to COTR or authorized VA representative, Contractor, unless other arrangements are agreed to in writing by the COTR or authorized VA representative. Submit reports of tests that fail to meet construction contract requirements on colored paper.

D. Verbal Reports: Give verbal notification to COTR or authorized VA representative immediately of any irregularity.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 EARTHWORK:

A. General: The Testing Laboratory shall provide qualified personnel, materials, equipment, and transportation as required to perform the services identified/required herein, within the agreed to schedule and/or time frame. The work to be performed shall be as identified herein and shall include but not be limited to the following:

1. Observe fill and subgrades during proof-rolling to evaluate suitability of surface material to receive fill or base course. Provide recommendations to the COTR or authorized VA representative regarding suitability or unsuitability of areas where proof-rolling was observed. Where unsuitable results are observed, witness excavation of unsuitable material and recommend to COTR or authorized VA representative extent of removal and replacement of unsuitable materials and observe proof-rolling of replaced areas until satisfactory results are obtained.
2. Provide part time observation of fill placement and compaction and field density testing in building areas and provide part time observation of fill placement and compaction and field density testing in pavement areas to verify that earthwork compaction obtained is in accordance with contract documents.
3. Provide supervised geotechnical technician to inspect excavation, subsurface preparation, and backfill for structural fill.

B. Testing Compaction:

1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with ASTM D698 and/or ASTM D1557.

2. Make field density tests in accordance with the primary testing method following ASTM D2922 wherever possible. Field density tests utilizing ASTM D1556 shall be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they should provide satisfactory explanation to the COTR or authorized VA representative before the tests are conducted.

    a. Building Slab Subgrade: At least one test of subgrade for every 185 m^2 (2000 square feet) of building slab, but in no case fewer than three tests. In each compacted fill layer, perform one test for every 185 m^2 (2000 square feet) of overlaying building slab, but in no case fewer than three tests.
    b. Pavement Subgrade: One test for each 335 m^2 (400 square yards), but in no case fewer than two tests.
    c. Curb, Gutter, and Sidewalk: One test for each 90 m (300 feet), but in no case fewer than two tests.
    d. Trenches: One test at maximum 30 m (100 foot) intervals per 1200 mm (4 foot) of vertical lift and at changes in required density, but in no case fewer than two tests.
    e. Footing Subgrade: At least one test for each layer of soil on which footings will be placed. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested subgrade when acceptable to COTR or authorized VA representative. In each compacted fill layer below wall footings, perform one field density test for every 30 m (100 feet) of wall. Verify subgrade is level, all loose or disturbed soils have been removed, and correlate actual soil conditions observed with those indicated by test borings.

C. Testing for Footing Bearing Capacity: Evaluate if suitable bearing capacity material is encountered in footing subgrade.

D. Testing Materials: Test suitability of on-site and off-site borrow as directed by Resident Engineer.

3.2 ASPHALT CONCRETE PAVING:

A. Aggregate Base Course:

1. Determine maximum density and optimum moisture content for aggregate base material in accordance with ASTM D1557, Method D.
2. Make a minimum of three field density tests on each day's final compaction on each aggregate course in accordance with ASTM D1556.
3. Sample and test aggregate as necessary to insure compliance with specification requirements for gradation, wear, and soundness as specified in the applicable state highway standards and specifications.

B. Asphalt Concrete:

1. Aggregate: Sample and test aggregates in stock pile and hot-bins as necessary to insure compliance with specification requirements for gradation (AASHTO T27), wear (AASHTO T96), and soundness (AASHTO T104).
2. Temperature: Check temperature of each load of asphalt concrete at mixing plant and at site of paving operation.

3. Density: Make a minimum of two field density tests in accordance with ASTM D1188 of asphalt base and surface course for each day's paving operation.

3.3 SITE WORK CONCRETE:

Test site work concrete including materials for concrete as required in Article CONCRETE of this section.

3.4 CONCRETE:

A. Field Inspection and Materials Testing:

1. Provide a technician at site of placement at all times to perform concrete sampling and testing.
2. Review the delivery tickets of the ready-mix concrete trucks arriving on-site. Notify the Contractor if the concrete cannot be placed within the specified time limits or if the type of concrete delivered is incorrect. Reject any loads that do not comply with the Specification requirements. Rejected loads are to be removed from the site at the Contractor's expense. Any rejected concrete that is placed will be subject to removal.
3. Take concrete samples at point of placement in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with ASTM C31. Make at least five cylinders for each 50 cubic yards or less of each concrete type, and at least five cylinders for any one day's pour for each concrete type. Label each cylinder with an identification number. COTR or authorized VA representative may require additional cylinders to be molded and cured under job conditions.
4. Perform slump tests in accordance with ASTM C143. Test the first truck each day, and every time test cylinders are made. Test pumped concrete at the hopper and at the discharge end of the hose at the beginning of each day's pumping operations to determine change in slump.
5. Determine the air content of concrete per ASTM C173. For concrete required to be air-entrained, test the first truck and every 25 cubic yards thereafter each day. For concrete not required to be air-entrained, test every 100 cubic yards at random. For pumped concrete, initially test concrete at both the hopper and the discharge end of the hose to determine change in air content.
6. If slump or air content fall outside specified limits, make another test immediately from another portion of same batch.
7. Perform unit weight tests in compliance with ASTM C138 for normal weight concrete and ASTM C567 for lightweight concrete. Test the first truck and each time cylinders are made.
8. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.
9. Verify that specified mixing has been accomplished.
10. Environmental Conditions: Determine the temperature per ASTM C1064 for each truckload of concrete during hot weather and cold weather concreting operations:
    a. When ambient air temperature falls below 40 degrees F, record maximum and minimum air temperatures in each 24 hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.
    b. When ambient air temperature rises above 85 degrees F, record maximum and minimum air temperature in each 24 hour period; record minimum relative humidity; record maximum wind velocity; record maximum temperature of surface of hardened concrete.

11. Inspect the reinforcing steel placement, including bar size, bar spacing, top and bottom concrete cover, proper tie into the chairs, and grade of steel prior to concrete placement. Submit detailed report of observations.
12. Observe conveying, placement, and consolidation of concrete for conformance to specifications.
13. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair of surface defects.
14. Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.
15. Observe preparations for placement of concrete:
    a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
    b. Inspect preparation of construction, expansion, and isolation joints.
16. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.
17. Observe concrete mixing:
    a. Monitor and record amount of water added at project site.
    b. Observe minimum and maximum mixing times.
18. Measure concrete flatwork for levelness and flatness as follows:
    a. Perform Floor Tolerance Measurements F_F and F_L in accordance with ASTM E1155. Calculate the actual overall F- numbers using the inferior/superior area method.
    b. Perform all floor tolerance measurements within 48 hours after slab installation and prior to removal of shoring and formwork.
    c. Provide the Contractor and the COTR or authorized VA representative with the results of all profile tests, including a running tabulation of the overall F_F and F_L values for all slabs installed to date, within 72 hours after each slab installation.
19. Other inspections:
    a. Grouting under base plates.
    b. Grouting anchor bolts and reinforcing steel in hardened concrete.

B. Laboratory Tests of Field Samples:

1. Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test two cylinders at 7 days and two cylinders at 28 days. Use remaining cylinder as a spare tested as directed by Resident Engineer. Compile laboratory test reports as follows: Compressive strength test shall be result of one cylinder, except when one cylinder shows evidence of improper sampling, molding or testing, in which case it shall be discarded and strength of spare cylinder shall be used.
2. Furnish certified compression test reports (duplicate) to Resident Engineer. In test report, indicate the following information:
    a. Cylinder identification number and date cast.
    b. Specific location at which test samples were taken.
    c. Type of concrete, slump, and percent air.
    d. Compressive strength of concrete in psi.
    e. Weather conditions during placing.
    f. Temperature of concrete in each test cylinder when test cylinder was molded.
    g. Maximum and minimum ambient temperature during placing.
    h. Ambient temperature when concrete sample in test cylinder was taken.
    i. Date delivered to laboratory and date tested.

3.5 MASONRY:

A. Mortar Tests:

1. Laboratory compressive strength test:
   a. Comply with ASTM C780.
   b. Obtain samples during or immediately after discharge from batch mixer.
   c. Furnish molds with 2 inch, 3 compartment gang cube.
   d. Test one sample at 7 days and 2 samples at 28 days.
2. Two tests during first week of operation; one test per week after initial test until masonry completion.

B. Grout Tests:

1. Laboratory compressive strength test:
   a. Comply with ASTM C1019.
   b. Test one sample at 7 days and 2 samples at 28 days.
   c. Perform test for each 2500 square feet of masonry.

C. Masonry Unit Tests:

1. Laboratory Compressive Strength Test:
   a. Comply with ASTM C140.
   b. Test 3 samples for each 5000 square feet of wall area.

D. Prism Tests: For each type of wall construction indicated, test masonry prisms per ASTM C1314 for each 5000 square feet of wall area. Prepare one set of prisms for testing at 7 days and one set for testing at 28 days.

END OF SECTION 014529

SECTION 031119

INSULATING CONCRETE FORMING

PART 1 GENERAL

1.01 SUMMARY

A. Supply and installation of Insulating Concrete Forms (ICF), installation of reinforcing steel and placement of concrete within formwork.

C. Adequate bracing and falsework shall be provided by the Installing Contractor to comply with all applicable Codes and construction document specifications.

1.02 SCOPE OF WORK

A. Furnish all labor, materials, tools and equipment to perform the installation of Insulating Concrete Formwork system forms in accordance with all ICF manufactures recommended guidelines.

B. Furnish all labor to include placement of reinforcing steel within forms, placement of concrete into forms, and final cleanup.

1.03 PRODUCTS SUPPLIED BUT NOT SPECIFIED OR INSTALLED UNDER THIS SECTION

A. EPS compatible modified bituminous sheet or fluid applied waterproofing membranes.

1.04 PRODUCTS INSTALLED BUT NOT SPECIFIED OR SUPPLIED UNDER THIS SECTION

A. Sleeves
B. Inserts
C. Anchors
D. Bolts
E. Reinforcing Steel
F. Window and Door Opening Bucks
G. Concrete

1.05 RELATED SECTIONS

A.	Section 03 20 00	-	Concrete Reinforcing
B.	Section 03 30 53	-	Cast-In-Place Concrete
C.	Section 03 40 00	-	Precast Concrete
D.	Division 04 00 00	-	Masonry
E.	Division 05 00 00	-	Metals
F.	Division 06 00 00	-	Wood, Plastics and Composites
G.	Section 07 13 00	-	Sheet Waterproofing
K.	Division 08 00 00	-	Openings
L.	Section 09 20 00	-	Plaster and Gypsum Board

1.06 ALTERNATES

A. Materials shall be only as specified in Paragraphs 1.02 and 2.02 as per Manufacturer specified in Paragraph 2.01. No alternate materials shall be accepted for this Section.

1.07 REFERENCES

A.	ACI 318	Building Code Requirements for Reinforced Concrete
B.	ACI 332	Guide to Residential Cast-in-Place Concrete Construction
C.	ASTM C236	Steady State Thermal Performance of Building Assemblies
D.	ASTM C473	Physical Testing of Gypsum Board Products and Gypsum Lath
E.	ASTM D1761	Mechanical Fasteners in Wood
F.	ASTM E84	Surface Burning Characteristics of Building Materials
G.	UBC 26-3	Uniform Building Code Standard Room Fire Test

1.08 DEFINITIONS

A. *ICF Bracing System* - a form alignment and scaffold system designed exclusively for use with Insulating Concrete Forms.

B. *Contractor Installer*- An installation contractor, who has received instructional training in the installation of ICF wall system forms (as administered by ICF manufacturer)

C. *Technical Advisor*- A technical representative, usually a staff member of a Distribution Firm, who has received instructional training in the installation of ICF wall system forms (as administered by ICF manufacturer) and is in the capacity of supervising an installation crew on site.

D. *EPS*- Acronym for “Expanded Polystyrene” when referencing the insulating foam component of the ICF wall system form.

E. *ICF* - Acronym for “Insulating Concrete Form”.

F. *Window or Door Opening Buck* - a pre-manufactured or site constructed frame assembly consisting of wood or plastic material used to frame a rough opening within the forming system that will retain concrete around the opening. The frame can also provide for subsequent anchorage of doors and windows within the wall assembly.

1.09 SYSTEM DESCRIPTION / PERFORMANCE REQUIREMENTS

A. Insulating Concrete Form wall system shall consist of two opposing panels of flame resistant Expanded Polystyrene (*EPS*) connected by high-density polypropylene webs.

B. Wall system to provide min. 4”, 6”, 8”, 10”, or 12-1/2” wall section (as indicated and required) at all locations throughout wall area.

C. Wall system webs to provide min. 1” (25mm) wide fastening strips @ 8” (200mm) o/c flush to ICF wall face for full wall height to facilitate direct fastening of interior and exterior finishes.

D. Wall system to provide accurate positioning of steel reinforcement within form cavity to conform to reinforcing requirements of ACI 318.

E. EPS foam panels with concrete to provide min. insulation levels as noted:

4”	(100 mm) Cavity Form Unit: R 17.1 (RSI 3.01)
6”	(160 mm) Cavity Form Unit: R 22.1 (RSI 3.89)
8”	(200 mm) Cavity Form Unit: R 21.7 (RSI 3.82)
10”	(250 mm) Cavity Form Unit: R 21.8 (RSI 3.83)

F. EPS foam to provide maximum vapor permeation of 3.5 Perm-in. (200 ng/Pa.s.m^2)

G. Finished wall assembly to provide min. rating of STC 50 sound attenuation performance.

1.10 SUBMITTALS

A. Product Data: Submit relevant laboratory tests or data to validate product compliance with performance criteria specified prior to commencement of work under this Section.

B. Code Compliance Data: Submit relevant code compliance data, to include current manufacturers ICC-ES Evaluation Report.

B. Submit copy of Manufacturer's Product Manual and Installation Instructions.

C. Shop Drawings: Submit drawings indicating dimensions of ICF form types and typical details required to complete the ICF installation, if not already specified with project drawings or specifications.

.

1.11 QUALITY ASSURANCE

A. Contractor shall engage a trained ICF *Contractor Installer* or *Technical Advisor* for the duration of the work under this Section.

B. *Contractor Installer /Technical Advisor* shall furnish proof of three years of experience in installing this product and meet Manufacturer's qualifying criteria. Installer shall furnish proof of training documentation to Contractor prior to commencement of work under this Section.

D. Site Mock-up: If required, construct sample wall mock-up panel to include full wall system and details, located where directed by Consultant. Panel may form part of finished work if approved by Consultant.

E. *Contractor Installer/Technical Advisor* to meet with Contractor prior to material delivery on site to co-ordinate provision of access, storage area, and protection of the ICF product and spatial requirements for form alignment placement steel storage and forming.

F. Pre-installation meeting: Prior to starting ICF work, convene meeting at project site. Include Contract Installer and sub-trades responsible for installing work that requires interface or modification to the ICF wall system.

G. Installation to comply with project drawings, specifications, governing building codes and regulations, and Manufacturer's installation manual or guide.

1.12 DELIVERY STORAGE and HANDLING

A. Deliver products in original factory packaging, bearing identification of product, manufacturer and batch/lot number.

B. Handle and store products in location to prevent damaging and soiling.

C. Ensure that UV protection is provided for material, should on-site storage extend beyond 30 days.

1.13 PROJECT CONDITIONS

A. Use appropriate measures for protection and supplementary heating when required to ensure proper curing conditions in accordance with manufacturer's recommendations if installation is carried out during periods of weather where temperatures are below minimum specified by governing Building Code for concrete and masonry.

1.14 COORDINATION

A. Ensure those materials listed under Sub-Section 1.03 and 1.04 are provided to *Contractor Installer* prior to commencement of work under this Section.

1.15 WARRANTY

A. Contact Manufacturer for supply of written copy of specific warranties of the product.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. ARXX Corporation
800 Division Street, Cobourg,
Ontario, K9A 5V2, Canada
Phone: (800) 293-3210 Fax: (905) 373-8301
E-Mail: info@arxx.com Web Page: www.arxx.com

B. All material is to be by ARXX. Obtain competitive pricing from installers approved by ARXX.

2.02 MATERIALS

A. Insulating concrete forms shall be supplied by an approved manufactured listed in Sub-Section 2.01 above.

B. Form units to be supplied through an authorized ICF Distributor.

C. Substitutes and alternates will not be accepted. (See Section 1.06).

2.03 MANUFACTURED ICF COMPONENTS

A. Contractor to provide dimension drawings for each ICF product, proposed for proper execution of the work: (List only ICF form units required)

For Example:

ARXX Corporation - Arxx Prime ICF system

		Metric mm
(a)	4", 6", 8" and 10" Standard Form Units	(100,160, 200 and 250)
	4" Core - 48"L x 8" W x 16 ¾"H	(1220x200x425)
	6" Core - 48"L x 11 ½" W x 16 ¾"H	(1220x290x425)
	6" Core – 48"L x 11 ½" W x 12" H	(1220x290x310)
	8" Core - 48"L x 12 ½" W x 16 ¾"H	(1220x320x425)
	8" Core – 48"L x 12 ½" W x 12" H	(1220x320x310)
	10" Core - 48"L x 14 7/8" W x 16¾"H	(1220x380x425)
(b)	4", 6", 8" and 10" Left and Right 90° Corners x16 ¾"H	(100, 160, 200 and 250)
(c)	6" and 8" Left and Right Corners x 12"H	(160 and 200)

(d)	6” and 8” Extended Brick Ledge	(160 and 200)
(e)	6” and 8” 45° Corner	(160 and 200)
(f)	6 ” Taper Top	(160)
(g)	End Cap- 6" (6 ¼” W x 16 ¾”H)	(160 x 425)

2.04 CONCRETE

A. Concrete supplied under Section 03 30 53 shall be of strength as specified by the design engineer (measured at 28 days). Recommended aggregate size to be 3/8” (10mm) aggregate for the 4” and 6” (100 and 160mm) forms and, ¾” (19mm) aggregate for the 8” and 10” (200 and 250mm) forms.

B. Recommended concrete slump is 6” +/- 1” (150mm +/- 25mm) (subject to design revision to suit application and ICF manufactures specifications).

2.05 REINFORCING STEEL

A. Reinforcing steel shall be as specified in Section 03 20 00 and shall be supplied under that Section for placement by the ICF Contractor Installer.

B. Reinforcing steel grade, size, placement and spacing shall be as specified by the project design engineer of record in accordance with the project drawings or specifications or prescriptive reinforcement tables applicable to the specific project.

2.06 WALL ALIGNMENT SYSTEM

A. As an integral installation component of an Insulating Concrete Form wall system and to aid in the construction of the wall system, to provide an adjustable device for ensuring plumbness of the wall during construction, an ICF Alignment Scaffold System shall be used.

B. ICF Alignment Scaffold System to be used to be OSHA compliant.

2.07 WATERPROOFING

A. Where called for on drawings, Waterproofing shall be Peel and Stick modified bituminous membrane or Fluid-Applied, water based waterproofing. Material to be specified under Section 07 13 00 (Sheet Waterproofing) and 07 14 00 Fluid-Applied Waterproofing).

B. Waterproofing material shall be EPS foam compatible.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect all areas included in Scope of Work to establish extent of work and verify site access conditions.

3.02 SITE VERIFICATION OF CONDITIONS

A. Examine footings installed under Section 03 30 53 are within +/-¼”(6mm) of level and that steps in footings are consistent with height of ICF forms.

B. Ensure all required testing and verification of footings and/or foundation installed under Section 03 30 53 have been conducted and approved, prior to ICF installation.

C. If specified, ensure reinforcing steel dowels are in place at specified centers along footing lengths.

3.03 PREPARATION

A. Clean all debris from top of footings prior to commencing work.

3.04 INSTALLATION

A. Installation of forms to be in strict accordance with Manufacturer's Product Manual as supplied in evidence to contractor under Sub Section 1.10 of this Section.

B. The Installation Contractor shall ensure Manufacturer's procedures for the following work are employed on site (As outlined in the Manufacturer's Installation Manual):

(a) First Course Placement
(b) Horizontal Reinforcement Placement
(c) Successive Course Placement
(d) Door and Window Opening Construction
(e) Form Alignment and Scaffolding Installation
(f) Vertical Reinforcement Placement
(g) Pre-Concrete Placement Inspection
(h) Concrete Placement
(i) Alignment Assembly Removal

3.05 SERVICE PENETRATIONS, INSERTS, AND EMBEDDMENTS

A. Service penetrations (e.g.- electrical service conduits, water service pipes, air supply and exhaust ducts etc.) shall be installed at the required locations as indicated by the appropriate trade.

B. Service penetrations exceeding 16" x 16" (400mm x 400mm) in area shall be reinforced.

C. Prior to concrete placement, install service penetration sleeves (supplied by others) at designated locations to create voids where services can be passed through at later date.

D. Coordinate with work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, steel embeds and other components of other work.

E. Locate and set in place items which will be cast directly into concrete.

3.06 FORM CLEANING

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

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

3.07 CLEANUP

A. Clean up and properly dispose of all debris remaining on job site related to the installation of the insulated concrete forms.

3.08 PROTECTION

A. Provide temporary coverage of installation to reduce exposure to Ultra Violet light should final finish application be delayed longer than 60 days.

END OF SECTION 031119

SECTION 032000

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. Work Included This Section: Work shall include providing the following and all other items related to concrete reinforcement.
   1. Metal Reinforcement
   2. Metal Accessories
   3. Plastic Accessories

B. Related Work Specified Elsewhere:
   1. Cast-In-Place Concrete (033000)

1.2 QUALITY ASSURANCE:

A. Standard Reference:
   1.The Standard Reference shall be the ACI 301, hereinafter called ACI; The American Welding Society Structural Welding Code and ASTM Specifications as listed.
   2.The Current edition of the following standard reference shall apply to the work of this Section. Contractor shall be responsible for obtaining latest edition.

ASTM A82	Specifications for Cold Drawn Steel Wire for Concrete Reinforcement.
ASTM A185	Specification for Welded Steel Wire Fabric For Concrete Reinforcement.
ASTM A615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
ACI 301	Specifications for Structural Concrete for Buildings.
ACI 315	Manual for Standard Practice for Detailing Reinforced Concrete Structures.
ACI 318	Building Code Requirements for Reinforced Concrete
AWS D1.1	Structural Welding Code.

1.3 SUBMITTALS:

A. Shop Drawings:
   1. Submit for approval, in accordance with Section 01300 -- Submittals. Shop Drawings shall show placing plans, bending details and bar lists.

1.4 STORAGE OF MATERIALS:

A. Reinforcing steel delivered to the job, and not immediately placed in forms, shall be stored under cover and protected from mud, rusting, oil, grease, or distortion.

1.5 CLEANING:

A. At the time of placing concrete, reinforcing shall be free from rust, oil, scale or other coatings that will destroy or deduce bond.

1.6 INSPECTION OF STEEL PLACEMENT:

A. Steel placement shall be inspected by an Independent Testing laboratory as outlined in the Manual of Practice, Scope of Services, Material, Engineering, Testing and Inspection published by the American Council of Independent Laboratories, Inc. Provide a copy of the report directly to the Architect.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Metal Reinforcement: Metal Reinforcement shall be deformed type bars conforming to ASTM A 615. Reinforcement shall be manufactured from new billet steel and shall conform to ASTM A 615. Grade shall be as indicated on the Drawings.

B. Welded Wire Fabric: Welded Wire Fabric shall conform to the requirements of ASTM A 18 or ASTM A 82, respectively. Size and guage shall be as indicated on Drawings.

C. Metal Accessories: Include all spacers, ties, chairs, bolsters and other devices required to properly support and fasten reinforcing steel in place in accordance with the requirements of ACI 315. Location and types of support shall be shown on shop drawings. Accessories required by other trades shall be furnished by those trades and installed under this Section.

D. Shop Fabrication: Reinforcing steel shall be fabricated to shapes and dimensions indicated on the drawings and in compliance with applicable provisions of ACI 315 and ACI 318. Bars shall be bent cold in the shop or bent in the field.

PART 3 - EXECUTION

3.1 INSPECTION:

A. The installer must examine the conditions under which concrete reinforcement is to be placed, and notify the Architect in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 INSTALLATION:

A. Placement:

1. Reinforcement shall be placed accurately in accordance with the Drawings and adequately secured in position with metal chairs, spacers with ties and other devices to properly support and fasten in accordance with ACI.
2. Metal reinforcement, at the time concrete is placed, shall be free from rust, scale, mud or other coatings that will destroy or reduce bond. Bars with kinks or bends not shown on the plans shall not be used. Metal reinforcement shall be accurately placed in accordance with the plans. Secure in position with not less than 16-guage annealed wire or suitable clips at intersections. Hold securely the required distance from the forms by concrete or metal chairs and spacers. Nails shall not be driven into outside forms or support reinforcement.

B. Concrete Cover: Where not shown on Drawings, the thickness of concrete over reinforcement shall be as follows:

1. Slabs -- 1” clear to interior surfaces
2. Footings -- 3” clear to sides and bottom
3. Walls -- Surfaces backfilled with earth - 2"
4. Slabs on Grade -- Surfaces exposed to ground – 3”

C. Splicing: Splices and offsets of reinforcing shall be in accordance with ACI and as shown and noted on the drawings . All reinforcing splices shall have a minimum lap of 24 bar diameters unless noted otherwise. All reinforcement shall be accurately placed in the forms and securely tied in position prior to pouring of concrete.

D. Wire Fabric: Install as indicated on drawings. Lap all joints 6” and wire securely. Extend mesh to within 2” of all sides and ends of slabs.

END OF SECTION 032000

SECTION 033053 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies cast-in-place structural concrete and material and mixes for other concrete.

1.2 RELATED WORK:

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Concrete roads, walks, and similar exterior site work: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.

1.3 TOLERANCES:

A. ACI 117.

B. Slab Finishes: ACI 117, F-number method in accordance with ASTM E1155.

1.4 REGULATORY REQUIREMENTS:

A. ACI SP-66 ACI Detailing Manual

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

1.5 SUBMITTALS:

A. Concrete Mix Design.

B. Shop Drawings: Reinforcing steel: Complete shop drawings.

C. Manufacturer's Certificates: Air-entraining admixture, chemical admixtures, curing compounds.

1.6 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Concrete Institute (ACI):

117R-06 ..... Tolerances for Concrete Construction and Materials
211.1-91(R2002) ..... Proportions for Normal, Heavyweight, and Mass Concrete
211.2-98(R2004) ..... Proportions for Structural Lightweight Concrete
301-05 ..... Specification for Structural Concrete
305R-06 ..... Hot Weather Concreting

306R-2002 ..... Cold Weather Concreting
SP-66-04 ..... ACI Detailing Manual
318/318R-05 ..... Building Code Requirements for Reinforced Concrete
347R-04 ..... Guide to Formwork for Concrete

C. American Society for Testing And Materials (ASTM):

A185-07 ..... Steel Welded Wire, Fabric, Plain for Concrete Reinforcement
A615/A615M-08 ..... Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
A996/A996M-06 ..... Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
C31/C31M-08 ..... Making and Curing Concrete Test Specimens in the Field
C33-07 ..... Concrete Aggregates
C39/C39M-05 ..... Compressive Strength of Cylindrical Concrete Specimens
C94/C94M-07 ..... Ready-Mixed Concrete
C143/C143M-05 ..... Standard Test Method for Slump of Hydraulic Cement Concrete
C150-07 ..... Portland Cement
C171-07 ..... Sheet Material for Curing Concrete
C172-07 ..... Sampling Freshly Mixed Concrete
C173-07. Air Content of Freshly Mixed Concrete by the Volumetric Method
C192/C192M-07 ..... Making and Curing Concrete Test Specimens in the Laboratory
C231-08 ..... Air Content of Freshly Mixed Concrete by the Pressure Method
C260-06 ..... Air-Entraining Admixtures for Concrete
C330-05 ..... Lightweight Aggregates for Structural Concrete
C494/C494M-08 ..... Chemical Admixtures for Concrete
C618-08 ..... Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
D1751-04. Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
D4397-02 ..... Polyethylene Sheeting for Construction, Industrial and Agricultural Applications E1155-96(2008) Determining F_F Floor Flatness and F_L Floor Levelness Numbers

PART 2 - PRODUCTS

21 FORMS:

Insulated concrete forms, approved by Resident Engineer, of grade or type suitable to obtain type of finish specified.

22 MATERIALS:

A. Portland Cement: ASTM C150, Type I or II.

B. Fly Ash: ASTM C618, Class C or F including supplementary optional requirements relating to reactive aggregates and alkalis, and loss on ignition (LOI) not to exceed 5 percent.

C. Coarse Aggregate: ASTM C33, Size 67. Size 467 may be used for footings and walls over 300 mm (12 inches) thick. Coarse aggregate for applied topping and metal pan stair fill shall be Size 7.

D. Fine Aggregate: ASTM C33.

E. Mixing Water: Fresh, clean, and potable.

F. Air-Entraining Admixture: ASTM C260.

G. Chemical Admixtures: ASTM C494.

H. Vapor Barrier: ASTM D4397, 0.25 mm (10 mil).

I. Reinforcing Steel: ASTM A615, Grade 60, deformed.

J. Welded Wire Fabric: ASTM A185.

K. Expansion Joint Filler: ASTM D1751.

L. Sheet Materials for Curing Concrete: ASTM C171.

23 CONCRETE MIXES:

A. Design of concrete mixes using materials specified shall be the responsibility of the Contractor as set forth under Option C of ASTM C94.

B. Compressive strength at 28 days shall be not less than 25mpa (3000 psi).

C. Establish strength of concrete by testing prior to beginning concreting operation. Test consists of average of three cylinders made and cured in accordance with ASTM C192 and tested in accordance with ASTM C39.

D. Maximum slump for vibrated concrete is 100 mm (4 inches) tested in accordance with ASTM C143.

E. Cement and water factor (See Table I): **TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE**

Concrete: Strength	Non-Air-Entrained		Air-Entrained	
Min. 28 Day Comp. Str. MPa (psi)	Min. Cement kg/m^3 (lbs/c. yd)	Max. Water Cement Ratio	Min. Cement kg/m^3 (lbs/c. yd)	Max. Water Cement Ratio
28 (3500)[1]	300 (500)	0.55	310 (520)	0.52
25 (3000)[1]	280 (470)	.58	290 (490)	.55

Footnote 1. If trial mixes are used, the proposed mix design shall achieve a compressive strength 8.3 MPa (1200 psi) in excess of f'c.

F. Air-entrainment is required for all exterior concrete and as required for Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS. Air content shall conform with the following table:

TABLE I - TOTAL AIR CONTENT
FOR VARIOUS SIZES OF COARSE AGGREGATES (NORMAL CONCRETE)

Nominal Maximum Size of Coarse Aggregate	Total Air Content Percentage by Volume
10 mm (3/8 in)	6 to 10
13 mm (1/2 in)	5 to 9
19 mm (3/4 in)	4 to 8
25 mm (1 in)	3 1/2 to 6 1/2
40 mm (1 1/2 in)	3 to 6

2.4 BATCHING & MIXING:

A. Store, batch, and mix materials as specified in ASTM C94.

1. Job-Mixed: Concrete mixed at job site shall be mixed in a batch mixer in manner specified for stationary mixers in ASTM C94.
2. Ready-Mixed: Ready-mixed concrete comply with ASTM C94, except use of non-agitating equipment for transporting concrete to the site will not be permitted. With each load of concrete delivered to project, ready-mixed concrete producer shall furnish, in duplicate, certification as required by ASTM C94.

PART 3 - EXECUTION

3.1 FORMWORK:

A. Installation conform to ACI 347. Sufficiently tight to hold concrete without leakage, sufficiently braced to withstand vibration of concrete, and to carry, without appreciable deflection, all dead and live loads to which they may be subjected.

B. Treating and Wetting: Treat or wet contact forms as follows:

1. Coat plywood and board forms with non-staining form sealer. In hot weather cool forms by wetting with cool water just before concrete is placed.
2. Clean and coat removable metal forms with light form oil before reinforcement is placed. In hot weather cool metal forms by thoroughly wetting with water just before placing concrete.
3. Use sealer on reused plywood forms as specified for new material.

C. Inserts, sleeves, and similar items: Flashing reglets, masonry ties, anchors, inserts, wires, hangers, sleeves, boxes for floor hinges and other items specified as furnished under this and other sections of specifications and required to be in their final position at time concrete is placed shall be properly located, accurately positioned and built into construction, and maintained securely in place.

D. Construction Tolerances:

1. Contractor is responsible for setting and maintaining concrete formwork to assure erection of completed work within tolerances specified to accommodate installation or other rough and finish materials. Remedial work necessary for correcting excessive tolerances is the responsibility of the Contractor. Erected work that exceeds specified tolerance limits shall be remedied or removed and replaced, at no additional cost to the Government.
2. Permissible surface irregularities for various classes of materials are defined as "finishes" in specification sections covering individual materials. They are to be distinguished from tolerances specified which are applicable to surface irregularities of structural elements.

3.2 REINFORCEMENT:

Details of concrete reinforcement, unless otherwise shown, in accordance with ACI 318 and ACI SP-66. Support and securely tie reinforcing steel to prevent displacement during placing of concrete.

3.3 VAPOR BARRIER:

Except where membrane waterproofing is required, place interior concrete slabs on a continuous vapor barrier.

A. Lap joints 150 mm (6 inches) and seal with a compatible pressure-sensitive tape.

B. Patch punctures and tears.

3.4 PLACING CONCRETE:

A. Remove water from excavations before concrete is placed. Remove hardened concrete, debris and other foreign materials from interior of forms, and from inside of mixing and conveying equipment. Obtain approval of Resident Engineer before placing concrete. Provide screeds at required elevations for concrete slabs.

B. Before placing new concrete on or against concrete which has set, existing surfaces shall be roughened and cleaned free from all laitance, foreign matter, and loose particles.

C. Convey concrete from mixer to final place of deposit by method which will prevent segregation or loss of ingredients. Do not deposit in work concrete that has attained its initial set or has contained its water or cement more than 1 1/2 hours. Do not allow concrete to drop freely more than 1500 mm (5 feet) in unexposed work nor more than 900 mm (3 feet) in exposed work. Place and consolidate concrete in horizontal layers not exceeding 300 mm (12 inches) in thickness. Consolidate concrete by spading, rodding, and mechanical vibrator. Do not secure vibrator to forms or reinforcement. Vibration shall be carried on continuously with placing of concrete.

D. Hot weather placing of concrete: Follow recommendations of ACI 305R to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete.

E. Cold weather placing of concrete: Follow recommendations of ACI 306R, to prevent freezing of thin sections less than 300 mm (12 inches) and to permit concrete to gain strength properly, except that use of calcium chloride shall not be permitted without written approval from Resident Engineer.

3.5 PROTECTION AND CURING:

Protect exposed surfaces of concrete from premature drying, wash by rain or running water, wind, mechanical injury, and excessively hot or cold temperature. Curing method shall be subject to approval by Resident Engineer.

3.6 FORM REMOVAL:

Forms remain in place until concrete has a sufficient strength to carry its own weight and loads supported. Removal of forms at any time is the Contractor's sole responsibility.

3.7 SURFACE PREPARATION:

Immediately after forms have been removed and work has been examined and approved by Resident Engineer, remove loose materials, and patch all stone pockets, surface honeycomb, or similar deficiencies with cement mortar made with 1 part portland cement and 2 to 3 parts sand.

3.8 FINISHES:

A. Slab Finishes:

1. Scratch Finish: Slab surfaces to receive a bonded applied cementitious application shall all be thoroughly raked or wire broomed after partial setting (within 2 hours after placing) to roughen surface to insure a permanent bond between base slab and applied cementitious materials.
2. Floating: Allow water brought to surface by float used for rough finishing to evaporate before surface is again floated or troweled. Do not sprinkle dry cement on surface to absorb water.
3. Float Finish: Ramps, stair treads, and platforms, both interior and exterior, equipment pads, and slabs to receive non-cementitious materials, except as specified, shall be screened and floated to a smooth dense finish. After first floating, while surface is still soft, surfaces shall be checked for alignment using a straightedge or template. Correct high spots by cutting down with a trowel or similar tool and correct low spots by filling in with material of same composition as floor finish. Remove any surface projections on floated finish by rubbing or dry grinding. Refloat the slab to a uniform sandy texture.
4. Steel Trowel Finish: Applied toppings, concrete surfaces to receive resilient floor covering or carpet, future floor roof and all monolithic concrete floor slabs exposed in finished work and for which no other finish is shown or specified shall be steel troweled. Final steel troweling to secure a smooth, dense surface shall be delayed as long as possible, generally when the surface can no longer be dented with finger. During final troweling, tilt steel trowel at a slight angle and exert heavy pressure on trowel to compact cement paste and form a

dense, smooth surface. Finished surface shall be free of trowel marks, uniform in texture and appearance.

5. Broom Finish: Finish all exterior slabs, ramps, and stair treads with a bristle brush moistened with clear water after the surfaces have been floated.
6. Finished slab flatness (FF) and levelness (FL) values comply with the following minimum requirements:

Slab-On-Grade
Specified overall value F_F 25/F_L 20 Minimum local value F_F 17/F_L 15

3.9 SURFACE TREATMENTS:

A. Surface treatments shall be mixed and applied in accordance with manufacturer's printed instructions.

END OF SECTION 033053

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. See Division 05 Section Metals for furnishing steel lintels and shelf angles for unit masonry.

B. Submittals:

1. Samples for face brick and colored mortar.
2. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements.

C. Comply with ACI 530.1/ASCE 6/TMS 602.

D. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing required by authorities having jurisdiction.

E. Provide 4'0" x 4'0" masonry panel displaying both bricks and mortars. Sample panel shall include wall ties, building wrap, thru wall flashing, weeps, and sample end dams. Panel shall be approved by COTR or authorized VA representative.

PART 2 - PRODUCTS

2.1 MASONRY UNITS

A. Concrete Masonry Units: ASTM C 90; Weight Classification, Lightweight, Type II, non moisture-controlled units.

B. Face Brick: ASTM C 216, Grade SW, Type FBS.

1. Products:

a. Field Brick #1
   1. Redland Brick, Harmar 818, Iron Gate
   2. Size: Modular 3-5/8" wide by 2-1/4" high by 7-5/8" long.
   3. Solid Brick where exposed ends show.
   4. Mortar: Lafarge Mortar, color to match brick.

b. Accent Brick #2
   1. Redland Brick, Harmar 855, Smooth
   2. Size: Modular 3-5/8" wide by 2-1/4" high by 7-5/8" long.
   3. Solid Brick where exposed ends show.
   4. Mortar: Lafarge Mortar, color to match brick.

2. Size: 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long.

3. Solid brick with exposed surfaces finished for ends of sills and caps.

22 MORTAR AND GROUT

A. Mortar: ASTM C 270, proportion specification.

1. Masonry Cement:
2. Do not use calcium chloride in mortar.
3. For masonry below grade or in contact with earth, use Type M.
4. For reinforced masonry, use Type S.
5. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions, and for other applications where another type is not indicated, use Type N.
6. Colored Mortar: For face brick, use colored cement or cement-lime mix of color selected.
7. Water-Repellent Additive: For mortar used with concrete masonry units made with integral water repellent, use product recommended by manufacturer of units.

B. Grout: ASTM C 476 with a slump of 8 to 11 inches.

C. Refractory Mortar: Ground fireclay mortar or other refractory mortar that passes ASTM C 199 test and is acceptable to authorities having jurisdiction.

D. At brick color changes, mortar shall match brick above on vertical joints and bottom joint.

23 REINFORCEMENT, TIES, AND ANCHORS

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

B. Joint Reinforcement: ASTM A 951.

1. Coating: Hot-dip galvanized at exterior walls.
2. Wire Diameter for Side Rods: W2.8.
3. Wire Diameter for Cross Rods: W2.8.

C. Veneer Anchors: Hot-dip galvanized steel, two-piece adjustable masonry veneer anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to studs, and acceptable to authorities having jurisdiction.

2.4 EMBEDDED FLASHING (Through Wall Masonry Flashing)

A. Products: As manufactured by Hyload Cloaked Flashing System, Wadsworth, OH (http:/hyloadflashing.com).

1 High Performance Flashing Membranes:
   a. Hyload Flashing Membrane
   b. Hyload Surface Adhered (S/A) Membrane

c. Hyload Surface Adhered with DRIP Membrane
d. Hyload Cloaked Flashing System: preformed three-dimensional shapes
e. Surface Adhered: External / internal corners, level changes, End dams and Stop ends.
f. Built-In Flashing System: Internal/External Corners, Level Change, End dams and Stop ends.
g. Utility Cloaks: Internal Corner, Internal Sloped Corner.

2 Accessory Materials:
a. Hyload Bituminous Adhesive
b. Hyload Mastic

B. Flashing Membrane Type

1. Flashing Membrane
2. Self-Adhered Membrane

C. Cloaked Flashing System: Standard or customized three dimensional shapes (Cloaks) as indicated on the Drawings to form a complete flashing system with preformed corners, end dams, other special shapes and seaming materials; all provided by flashing sheet manufacturer.

D. Shop Drawings: Provide from Hyload a review of the flashing design for the project and location of Cloaks on reduced floor plan.

E. Pre-Construction Meeting: Review flashing for the project and how the flashing will be sequenced with the following: Below grade waterproofing, window installation, sealant installation and roofing. Representatives from all above trades should attend.

F. Accessory Flashing Materials: Flashing manufacturer's standard adhesive, primer and mastic products for bonding flashing sheets to each other, to Cloaks and to substrates. A 4" minimum overlap is required.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded strips complying with ASTM D 1056, Grade 2A1.

B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.

C. Weep Holes: Cellular-plastic extrusion, full height and width of head joint or open head joints.

D. Job Mixed Masonry Cleaner: Product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units.

2.6 CAVITY WALL FLASHING/DRAINAGE SYSTEM @ GROUND FLOOR LEVEL

2.6.1 General

A. Summary:

Product guide specification can be used to specify "TotalFlash" which is an all-inclusive flashing/drainage system. Product specification typically inserted into Section 040523 – MASONRY ASSEMBLIES or other similar masonry specification sections listed below. Section includes Flashing, Cavity Wall Drainage, Drip Edge, Termination Bar and Weeps. Replaces the requirement for flashing, weeps, mortar collection product, drip edge and termination bar.

B. Related Sections:

1. 04 05 23 Masonry Accessories
2. 04 21 13 Brick Masonry
3. 04 22 00 Concrete Unit Masonry
7. 07 60 00 Flashing and Sheet Metal
8. 07 65 00 Flexible Flashing

C References:

a. Industry Standards:
1. ASTM
2. BIA
3. MCAA

b. Industry Standards:
1. BIA Tech Note: Brick Construction - #7
   Water Penetration Resistance – Design and Detail
2. BIA Tech Note: Brick Construction - #28B
   Brick Veneer/Steel Stud Walls

D. Definitions:

a. Terms:
1. Cavity Wall Flashing
2. Foundation Sill Flashing
3. Through Wall Flashing
4. Termination Bar
5. Adhesive/Sealant for Flashing

E. Submittals:

a. Provide in accordance with Section 01330 (Submittal Procedures)
1. Product data and installation instructions.
2. Two sections demonstrating lap joint: Each 18" x 14".
3. Adhered flashing samples available.
4. NOTE: For TotalFlash/Restorations System – sample sections will be: 12" x 14"

2.6.2 Products

A. Acceptable Manufacturers:

a. Mortar Net USA Ltd, 541 S. Lake Street, Gary IN 46403
Ph: 800-664-6638 www.MoratarNet.com

B. Products:

Mortar Net's "TotalFlash" system or approved equal is designed to replace traditional flashing systems. Custom configurations for headers and door openings are available. TotalFlash system consists of: Hyload Flashing, manufactured by Hyload Inc,; Mortar Net Drainage/Weep System, Mortar Net Stainless Steel Drip Edge, if required and Mortar Net Termination Bar.

1. TotalFlash System:

Hyload Flashing:
The Hyload Flashing Membrane is a 40 mil polymeric, reinforced, UV stable membrane, incorporating DuPont's Elvaloy® KEE polymer. It is used to manufacture the TotalFlash system in the following panel sizes: 18" x 5'

2. Mortar Collection Device/Weep Tabs:

Recycled polyester material impregnated with UV protection, biocide to resist mold and flame retardant. Woven mesh designed to allow moisture to migrate to the integrated weep tabs; product adhered to the Hyload Flashing.

a. Thickness: 3/8 inch
b. Height: 10 inches
c. Length: 5 feet

C Drip Edge:

304 Stainless Steel Drip Edge pre-attached to the Hyload Flashing and designed to divert moisture away from the masonry wall.

1. 28 gauge
2. Length: 5 feet
3. Width: 2.0 inches

D Adhesive:

Provided with system for lapping TotalFlash sections

1. Multi Purpose/Structural Sealant/No Slump/Moisture Cure (Exceeds ASTM C920-94)
2. NO VOC
3. One part
4. 10.3 ounce tubes

E Termination Bar:

Pre-attached termination bar is designed to fasten flashing system to the substrate or can be tucked into mortar joint.

1. Strip manufactured from high strength corrosion resistance plastic with pre-drilled holes for attachment.
2. Length 5 feet

3. Hole spacing 6 inches

F. Screws:

Provided self-tapping hex head screws designed to allow attachment to Masonry, Wood or Steel Stud.

1. #14 x 1-1/4
2. Quantity per box 100 (10 screws per 5 foot section)

2.6.3 Execution

A. Installation:

1. Install Flashing/Drainage System in accordance with Manufacturer's installation instructions.

2. Install system as required by detailed project drawings for cavity wall drainage.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.

B. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.

C. Stopping and Resuming Work: Rack back units; do not tooth.

D. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

E. Tool exposed joints slightly concave when thumbprint hard, unless otherwise indicated.

F. Keep cavities clean of mortar droppings and other materials during construction. Clean out cavities after every three courses are laid.

G. Ensure that proper weeps are constructed and maintained during construction.

3.2 FLASHING AND WEEP HOLES

A. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.

B. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing before covering with mortar.

1. Extend flashing as indicated by the Hyload Flashing System manufacturer's recommendation.

33 CLEANING

A. Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly cured, clean exposed masonry.

1. Clean brick per manufacturer's recommended standards.

END OF SECTION 042000

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies structural steel shown and classified by Section 2, Code of Standard Practice for Steel Buildings and Bridges.

1.2 RELATED WORK:

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Steel Joist: Section 05 21 00, STEEL JOIST FRAMING.

C. Steel Decking: Section 05 31 00, STEEL DECKING.

1.3 QUALITY ASSURANCE:

A. Fabricator and erector shall maintain a program of quality assurance in conformance with Section 8, Code of Standard Practice for Steel Buildings and Bridges.

B. Before authorizing the commencement of steel erection, the controlling contractor shall ensure that the steel erector is provided with the written notification required by 29 CFR 1926.752. Provide copy of this notification to the Resident Engineer.

1.4 TOLERANCES:

Fabrication tolerances for structural steel shall be held within limits established by ASTM A6, by Section 7, Code of Standard Practice for Buildings and Bridges, and by Standard Mill Practice - General Information (AISC Manual, Thirteenth Edition, Page 1-9, except as follows:

A. Elevation tolerance for column splice points at time member is erected is 10 mm (3/8 inch).

B. Elevation tolerance for top surface of steel beams and girders at connections to columns at time floor is erected is 13 mm (1/2 inch).

C. Elevation tolerance for closure plates at the building perimeter and at slab openings prior to concrete placement is 6 mm (1/4 inch).

1.5 DESIGN:

A. Connections: Design and detail all connections for each member size, steel grade and connection type to resist the loads and reactions indicated on the drawings or specified herein. Use details consistent with the details shown on the Drawings, supplementing where necessary. The details shown on the Drawings are conceptual and do not indicate the required weld sizes or number of

bolts unless specifically noted. Use rational engineering design and standard practice in detailing, accounting for all loads and eccentricities in both the connection and the members. Promptly notify the Resident Engineer of any location where the connection design criteria is not clearly indicated. The design of all connections is subject to the review and acceptance of the Resident Engineer. Submit structural calculations prepared and sealed by a qualified engineer registered in the state where the project is located. Submit calculations for review before preparation of detail drawings.

1.6 REGULATORY REQUIREMENTS:

A. AISC: Specification for Structural Steel Buildings - Allowable Stress Design.

B. AISC: Code of Standard Practice for Steel Buildings and Bridges.

1.7 SUBMITTALS:

A. Shop and Erection Drawings: Complete

B. Certificates:

1. Structural steel.
2. Steel for all connections.
3. Welding materials.
4. Shop coat primer paint.

C. Test Reports:

1. Welders' qualifying tests.

D. Design Calculations and Drawings:

1. Connection calculations, if required.

1.8 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Institute of Steel Construction (AISC):

1. Specification for Structural Steel Buildings - Steel Construction manual, Thirteenth Edition, 2005.
2. Code of Standard Practice for Steel Buildings and Bridges (March 2000).

C. American National Standards Institute (ANSI):
B18.22.1-98 .....Plain Washers
B18.22M-00 ..... Metric Plain Washers

D. American Society for Testing and Materials (ASTM):

A6/A6M-02 .....Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
A36/A36M-01..... Standard Specification for Carbon Structural Steel
A53/A53M-01.....Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless A123/A123M-02Standard Specification for Zinc (Hot-Dip Galvanized) Coatings
on Iron and Steel Products A242/A242M-01.....Standard Specification for High-Strength Low-Alloy Structural Steel
A283/A283M-00..... Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates A307-00 Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
A325-02.....Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength A490-02
..... Standard Specification for Heat-Treated Steel Structural Bolts 150 ksi Minimum Tensile Strength
A500-01 .....Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
A501-01 .....Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing A572/A572M-01
.....Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
A992/A992M-02.....Standard Specification for Structural Steel Shapes

E. American Welding Society (AWS): D1.1-02....Structural Welding Code-Steel

F. Research Council on Structural Connections (RCSC) of The Engineering Foundation: Specification for Structural Joints Using ASTM A325 or A490 Bolts

G. Military Specifications (Mil. Spec.): MIL-P-21035 .....Paint, High Zinc Dust Content, Galvanizing, Repair

H. Occupational Safety and Health Administration (OSHA): 29 CFR Part 1926-2001.....Safety Standards for Steel Erection

PART 2 - PRODUCTS

21 MATERIALS:

A. Structural Steel: ASTM A36, and A992.

B. Structural Tubing: ASTM A500, Grade B.

C. Steel Pipe: ASTM A500, Grade B.

D. Bolts, Nuts and Washers:

1. High-strength bolts, including nuts and washers: ASTM A325.
2. Bolts and nuts, other than high-strength: ASTM A307, Grade A.
3. Plain washers, other than those in contact with high-strength bolt heads and nuts: ANSI Standard B18.22.1.

E. Zinc Coating: ASTM A123.

F. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035.

PART 3 - EXECUTION

31 CONNECTIONS (SHOP AND FIELD):

A. Welding: Welding in accordance with AWS D1.1. Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.1 to perform type of work required.

B. High-Strength Bolts: High-strength bolts tightened to a bolt tension not less than proof load given in Specification for Structural Joints Using ASTM A325 or A490 Bolts. Tightening done with properly calibrated wrenches, by turn-of-nut method or by use of direct tension indicators (bolts or washers). Tighten bolts in connections identified as slip-critical using Direct Tension Indicators or the turn-of-the-nut method. Twist-off torque bolts are not an acceptable alternate fastener for slip critical connections.

3.2 FABRICATION:

Fabrication in accordance with Chapter M, Specification for Steel Buildings - Allowable Stress Design and Plastic Design.

3.3 SHOP PAINTING:

A. General: Shop paint steel with primer in accordance with Section 6, Code of Standard Practice for Steel Buildings and Bridges.

B. Shop paint for steel surfaces is specified in Section 09 91 00, PAINTING.

C. Do not apply paint to following:

1. Surfaces within 50 mm (2 inches) of joints to be welded in field.
2. Surfaces which will be encased in concrete.
3. Surfaces which will receive sprayed on fireproofing.
4. Top flange of members which will have shear connector studs applied.

D. Zinc Coated (Hot Dip Galvanized) per ASTM A123 (after fabrication): Touch-up after erection: Clean and wire brush any abraded and other spots worn through zinc coating, including threaded portions of bolts and welds and touch-up with galvanizing repair paint.

3.4 ERECTION:

A. General: Erection in accordance with Section 7, Code of Standard Practice for Steel Buildings and Bridges.

B. Temporary Supports: Temporary support of structural steel frames during erection in accordance with Section 7, Code of Standard Practice for Steel Buildings and Bridges.

3.5 FIELD PAINTING:

A. After erection, touch-up steel surfaces specified to be shop painted. After welding is completed, clean and prime areas not painted due to field welding.

3.6 SURVEY:

Upon completion of finish bolting or welding on any part of the work, and prior to start of work by other trades that may be supported, attached, or applied to the structural steel work, submit a certified report of survey to Resident Engineer for approval. Reports shall be prepared by Registered Land Surveyor or Registered Civil Engineer as specified in Section 01 00 00, GENERAL REQUIREMENTS. Report shall specify that location of structural steel is acceptable for plumbness, level and alignment within specified tolerances specified in the AISC Manual.

END OF SECTION 051200

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies open web, longspan, and deep longspan steel joists.

1.2 RELATED WORK:

A. Structural Steel: Section 05 12 00, STRUCTURAL STEEL FRAMING.

1.3 DESIGN REQUIREMENTS:

Design all elements with the latest published version of applicable Codes.

1.4 TOLERANCES:

Deviation from a straight line between ends of any installed joist shall not exceed 10 mm in 3 m (3/8 inch in 10 feet).

1.5 REGULATORY REQUIREMENTS:

STEEL JOIST INSTITUTE: Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders, (Latest Edition).

1.6 SUBMITTALS:

A. Shop and Erection Drawings: Complete.

1. Fabrication drawings including details and schedules for the fabrication and assembly of each joist.
2. Erection drawings showing the size and location of each joist, bridging, cross bracing, bearing details, connections, welds, bolts and bearing plates.

B. Certificates: STEEL JOIST INSTITUTE compliance.

C. Design Calculations: If requested by the Resident Engineer, submit complete calculations covering the design of all members and connections. Calculations must be specifically applicable to the joists supplied.

1.7 QUALITY ASSURANCE:

Provide documentation that the joist manufacturer is a member of the Steel Joist Institute and has satisfactorily completed work of a similar scope and nature.

1.8 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Institute of Steel Construction (AISC):

1. Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design (Latest Edition).
2. Load and Resistance Factor Design Specification for Structural Steel Buildings (Latest Edition).

C. American Society for Testing and Materials (ASTM):

A307-07	Carbon Steel Bolts and Studs, 400 MPa (60,000 psi) Tensile Strength
A325-09	Structural Bolts, Steel, Heat Treated, 800/700 MPa (120/105 ksi) Minimum Tensile Strength
A490-08	Heat-Treated Steel Structural Bolts, 1000 MPA (150 ksi) Minimum Tensile Strengths

D. American Welding Society (AWS):

D1.1-08	Structural Welding Code - Steel

E. SSPC: The Society for Protective Coatings:
Steel Structures Painting Manual, Volumes 1 and 2

F. Steel Joist Institute (STEEL JOIST INSTITUTE):
Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders (Latest Edition).

G. U.S. Army Corps of Engineers: CRD-C-621 Specification for Non-Shrink Grout

PART 2 - PRODUCTS

21 OPEN WEB STEEL JOISTS:

K-Series conforming to STEEL JOIST INSTITUTE standard specifications.

22 ACCESSORIES - FITTINGS:

A. Accessories and fittings, including end supports and bridging, in accordance with standard STEEL JOIST INSTITUTE specification under which joists were designed.

B. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular hexagon type, low carbon steel.

C. High-strength bolts, including nuts and washers: ASTM A325 or A490 heavy hexagon structural bolts.

PART 3 - EXECUTION

3.1 FABRICATION:

A. Fabrication and assembly in accordance with applicable standard STEEL JOIST INSTITUTE specification:

1. Make chord splices with full penetration welds capable of developing the ultimate strength in tension of the parent material. Make no allowance for the strength of back-up bars or other material incidental to welding.
2. Provide shop-welded connection plates at panel points to receive supplemental framing.
3. Extended Ends: Provide extended ends on joists where shown, complying with manufacturer's standards and requirements of applicable STEEL JOIST INSTITUTE specifications.
4. Bridging: Provide horizontal or diagonal type bridging for joists and joist girders, complying with STEEL JOIST INSTITUTE specifications. Provide bridging anchors for ends of bridging lines terminating at walls or beams. Provide bridging adequate to resist the loads indicated on the Contract Documents.
5. End Anchorage: Provide end anchorages, including bearing plates, to secure joists to adjacent construction, complying with STEEL JOIST INSTITUTE specifications, unless otherwise indicated. Design all end anchorages to resist a minimum net uplift of 1.6 kPa (35 pounds per square foot) of supported area.
6. Provide supplemental steel support framing for metal deck where normal deck bearing is precluded by other framing members and minor openings.

3.2 SHOP PAINTING:

A. Shop painting in accordance with applicable STEEL JOIST INSTITUTE standard specification.

B. Shop paint joists and accessories with a rust-inhibiting primer paint. For joists which will be finish painted, limit paint to a primer which is compatible with specified finish paint. In high humidity areas, shop paint joists with a zinc-rich primer to receive top coats per the paint system manufacturer's recommendations.

3.3 ERECTION:

A. Installation of joists in accordance with applicable STEEL JOIST INSTITUTE standard specification.

B. Handle joists in a manner to avoid damaging of joists. Remove damaged joists from site, except when field repair is approved and such repairs are satisfactorily made in accordance with manufacturer's recommendations.

3.4 FIELD PAINTING:

A. Clean abraded, corroded, and field welded areas and touch up with same type of paint used in shop painting.

B. Finish painting of steel surfaces is specified in Section 09 91 00, PAINTING.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies material and services required for installation of steel decking as shown and specified.

1.2 RELATED WORK:

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

1.3 DESIGN REQUIREMENTS:

A. Design steel decking in accordance with AISI publication, "Specification for the Design of Cold-formed Steel Structural Members" except as otherwise shown or specified.

B. Design all elements with the latest published version of applicable codes.

1.4 SUBMITTALS:

A. Shop Drawings: Shop and erection drawings showing decking unit layout, connections to supporting members, and similar information necessary for completing installation as shown and specified, including supplementary framing, sump pans, ridge and valley plates, cant strips, cut openings, special jointing or other accessories. Show welding, side lap, closure, deck reinforcing and closure reinforcing details. Show openings required for work of other trades, including openings not shown on structural drawings. Indicate where temporary shoring is required to satisfy design criteria.

B. Manufacturer's Literature and Data: Showing steel decking section properties and specifying structural characteristics.

C. Insurance Certification: Assist the Government in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance.

1.5 QUALITY ASSURANCE:

A. FM Listing: Provide metal roof deck units which have been evaluated by Factory Mutual Global and are listed in “Factory Mutual Research Approval Guide” for “Class 1” fire rated construction.

1.6 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Society for Testing and Materials (ASTM):
A36/A36M-08.....Standard Specification for Carbon Structural Steel
A611-97 .....Standard Specification for Structural Steel (SS), Sheet, Carbon, Cold-Rolled
A653/A653M-08 .....Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
C423-08.....Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

C. American Institute of Steel Construction (AISC):

1. Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design (ninth Edition, 1989)

D. American Iron and Steel Institute (AISI):

1. Specification and Commentary for the Design of Cold-Formed Steel Structural Members

E. American Welding Society (AWS):
D1.3-08 .....Structural Welding Code - Sheet Steel

F. Factory Mutual (FM Global):

1. Loss Prevention Data Sheet 1-28: Wind Loads to Roof Systems and Roof Deck Securement
2. Factory Mutual Research Approval Guide (2002)

G. Military Specifications (Mil. Spec.)
MIL-P-21035B.....Paint, High Zinc Dust Content, Galvanizing Repair

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Steel Decking: ASTM A653, Structural Quality, Grade C, D, or E.

B. Galvanizing: ASTM A653, G60.

C. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035B.

D. Primer for Shop Painted Sheets: Manufacturer's standard primer (2 coats).

E. Miscellaneous Steel Shapes: ASTM A36.

F. Welding Electrode: E60XX minimum.

G. Sheet Metal Accessories: ASTM A653, galvanized, unless noted otherwise. Provide accessories of every kind required to complete the installation of metal decking in the system shown. Finish sheet metal items to match deck including, but not limited to, the following items:

1. Metal Cover Plates: For end-abutting deck units, to close gaps at changes in deck direction, columns, walls and openings. Same quality as deck units but not less than 1.3 mm (18 gauge) sheet steel.
2. Continuous Sheet Metal Edging: At openings, concrete slab edges and roof deck edges. Same quality as deck units but not less than 1.3 mm (18 gauge) steel. Side and end closures supporting concrete and their attachment to supporting steel shall be designed by the manufacturer to safely support the wet weight of concrete and construction loads. The deflection of cantilever closures shall be limited to 3 mm (1/8 inch) maximum.
3. Metal Closure Strips: For openings between decking and other construction, of not less than 1.3 mm (18 gauge) sheet steel of the same quality as the deck units. Form to the configuration required to provide tight-fitting closures at open ends of flutes and sides of decking.
4. Seat Angles for Deck: Provide where a beam does not frame into a column.
5. Sump Pans for Roof Drains: Fabricated from single piece of minimum 1.9 mm (14 gauge) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 75 mm (3 inches) wide. Recess pans not less than 38 mm (1 1/2 inches) below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.

2.2 REQUIREMENTS:

A. Provide steel decking of the type, depth, gauge, and section properties as shown.

B. Metal Roof Deck: Single pan fluted units with flat horizontal top surfaces utilized to act as a permanent support for all superimposed loads. Comply with the depth and minimum gage requirements as shown on the Contract Documents.

1. Wide Rib (Type B) deck.
2. Finish: Galvanized G-60.
3. Finish: Prime painted.

C. Metal Form Deck: Single pan fluted units with flat horizontal top surfaces utilized to act as a permanent support for all superimposed loads. Comply with the depth and minimum gage requirements as shown on the Contract Documents.

1. Conform (Type C) deck.
2. Finish: Galvanized G-60.
3. Finish: Prime painted.

D. Do not use steel deck for hanging supports for any type or kind of building components including suspended ceilings, electrical light fixtures, plumbing, heating, or air conditioning pipes or ducts or electrical conduits.

PART 3 - EXECUTION

3.1 ERECTION:

A. Do not start installation of metal decking until corresponding steel framework has been plumbed, aligned and completed and until temporary shoring, where required, has been installed. Remove any oil, dirt, paint, ice, water and rust from steel surfaces to which metal decking will be welded.

B. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

C. Provide steel decking in sufficient lengths to extend over 3 or more spans, except for interstitial levels.

D. Place steel decking units at right angles to supporting members. End laps of sheets of roof deck shall be a minimum of 50 mm (2 inches) and shall occur over supports.

E. Fastening Deck Units:

1. Fasten roof deck units to steel supporting members by not less than 16 mm (5/8 inch) diameter puddle welds or elongated welds of equal strength, spaced as specified on the Contract Documents.. Attach split or partial panels to the structure in every valley. In addition, secure deck to each supporting member in ribs where side laps occur. Power driven fasteners may be used in lieu of welding for roof deck if strength equivalent to the welding specified above is provided. Submit test data and design calculations verifying equivalent design strength.
2. Mechanically fasten side laps of adjacent roof deck units with spans greater than 1524 mm (5 feet) between supports, at intervals not exceeding 915 mm (3 feet) o.c., or midspan, whichever is closer, using self-tapping No. 8 or larger machine screws.
3. Provide any additional fastening necessary to comply with the requirements of Underwriters Laboratories and/or Factory Mutual to achieve the required ratings.
4. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading of 2.1 kPa (45 psf) at eave overhang and 1.4 kPa (30 psf) for other roof areas.

F. Cutting and Fitting:

1. Cut all metal deck units to proper length in the shop prior to shipping.
2. Field cutting by the metal deck erector is restricted to bevel cuts, notching to fit around columns and similar items, and cutting openings that are located and dimensioned on the Structural Drawings.
3. Other penetrations shown on the approved metal deck shop drawings but not shown on the Structural Drawings are to be located, cut and reinforced by the trade requiring the opening.
4. Make all cuts neat and trim using a metal saw, drill or punchout device; cutting with torches is expressly prohibited.

5. Do not make any cuts in the metal deck that are not shown on the approved metal deck drawings. If an additional opening not shown on the approved shop drawings is required, submit a sketch, to scale, locating the required new opening and any other openings and supports in the immediate area. Do not cut the opening until the sketch has been reviewed and accepted by the Resident Engineer. Provide any additional reinforcing or framing required for the opening at no cost to the Government. Failure to comply with these requirements is cause for rejection of the work and removal and replacement of the affected metal deck.
6. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.

3.2 WELDING:

Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.3.

3.3 FIELD REPAIR:

1. Areas scarred during erection.
2. Welds to be thoroughly cleaned and touched-up. Touch-up paint for zinc-coated units shall be zinc rich galvanizing repair paint.

END OF SECTION 053100

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION:

A. This section specifies materials and services required for installation of cold-formed steel, including tracks and required accessories as shown and specified. This Section includes the following:

1. Exterior non-load-bearing steel stud curtain wall.

1.2 RELATED WORK:

A. Structural steel framing: Section 05 12 00, STRUCTURAL STEEL FRAMING.

B. Open web steel joists: Section 05 21 00, STEEL JOIST FRAMING.

C. Non-load-bearing metal stud framing assemblies: Section 09 22 16, NON-STRUCTURAL METAL FRAMING.

D. Gypsum board assemblies: Section 09 29 00, GYPSUM BOARD.

1.3 DESIGN REQUIREMENTS:

A. Design steel in accordance with American Iron and Steel Institute Publication "Specification for the Design of Cold-Formed Steel Structural Members", except as otherwise shown or specified.

B. Structural Performance: Engineer, fabricate, and erect cold-formed metal framing to withstand design loads within limits and under conditions required.

1. Design Loads: As indicated.
2. Design framing systems to withstand design loads without deflections greater than the following:
   a. Walls: Lateral deflection of 1/240 of the wall height.
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 (range) of 67 degrees C (120 degrees F).
4. Design framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.
5. Design exterior non-load-bearing curtain wall framing to accommodate lateral deflection without regard to contribution of sheathing materials.
6. 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.

1.4 SUBMITTALS:

A. Shop Drawings: Shop and erection drawings showing steel unit layout, connections to supporting members, and information necessary to complete installation as shown and specified.

B. Manufacturer's Literature and Data: Showing steel component sections and specifying structural characteristics.

C. For cold-formed metal framing indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for its preparation.

1.5 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Iron and Steel Institute (AISI):

Specification and Commentary for the Design of Cold-Formed Steel Structural Members (1996)

C. American Society of Testing and Materials (ASTM):

A36/A36M(REV. A)-2003 .....Standard Specifications for Carbon Structural Steel
A123/A123M-2002 ..... Standard Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products A153/A153M-2003 Standard Specifications for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A307-2002 .....Standard Specifications for Carbon Steel Bolts and Studs
A653/A653M-2003..... Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
C955-2003 .....Standard Specifications for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases
C1107-2002 .....Standard Specifications for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)
E488-96(Reapproved 2003)Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements
E1190-95(Reapproved 2000)Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members

D. American Welding Society (AWS):

D1.3-(98) .....Structural Welding Code-Sheet Steel

E. Military Specifications (Mil. Spec.):

MIL-P-21035B(Reinst. Notice 2) Paint, High Zinc Dust Content, Galvanizing Repair

PART 2 – PRODUCTS

2.1 MATERIALS:

A. Sheet Steel for joists, studs and accessories 16 gage and heavier: ASTM A653, structural steel, zinc coated G90, with a yield of 340 MPa (50 ksi) minimum.

B. Sheet Steel for joists, studs and accessories 18 gage and lighter: ASTM A653, structural steel, zinc coated G90, with a yield of 230 MPa (33 ksi) minimum.

C. Galvanizing Repair Paint: MIL-P-21035B.

2.2 WALL FRAMING:

A. Steel Studs: Manufacturer's standard C-shaped steel studs of web depth indicated, with lipped flanges, and complying with the following:

1. Design Uncoated-Steel Thickness: As required by design with minimum thickness as noted on the drawings.
2. Flange Width: As required by design with minimum thickness as noted on the drawings.
3. Web: Punched.

B. Steel Track: Manufacturer's standard U-shaped steel track, unpunched, of web depths indicated, with straight flanges, and complying with the following:

1. Design Uncoated-Steel Thickness: As required by design with minimum thickness as noted on the drawings.
2. Flange Width: Manufacturer's standard deep flange where indicated, standard flange elsewhere.

2.3 FRAMING ACCESSORIES:

A. Fabricate steel framing accessories of the same material and finish used for framing members, with a minimum yield strength of 230 MPa (33 ksi).

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Deflection track and vertical slide clips.

2.4 ANCHORS, CLIPS, AND FASTENERS:

A. Steel Shapes and Clips: ASTM A36, zinc coated by the hot-dip process according to ASTM A123.

B. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times the design load, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.

C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times the design load, as determined by testing per ASTM E1190 conducted by a qualified independent testing agency.

D. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws. Low-profile head beneath sheathing, manufacturer's standard elsewhere.

2.5 REQUIREMENTS:

A. Welding in accordance with AWS D1.3

B. Furnish members and accessories by one manufacturer only.

PART 3 – EXECUTION

3.1 FABRICATION:

A. Framing components may be preassembled into panels. Panels shall be square with components attached.

B. Cut framing components squarely or as required for attachment. Cut framing members by sawing or shearing; do not torch cut.

C. Hold members in place until fastened.

D. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.

1. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
2. Locate mechanical fasteners and install according to cold-formed metal framing manufacturer's instructions with screw penetrating joined members by not less than 3 exposed screw threads.

E. Where required, provide specified insulation in double header members and double jamb studs which will not be accessible after erection.

3.2 ERECTION:

A. Securely anchor tracks to supports as shown.

B. At butt joints, securely anchor two pieces of track to same supporting member or butt-weld or splice together.

C. Plumb, align, and securely attach studs to flanges or webs of both upper and lower tracks.

D. Install jack studs above and below openings and as required to furnish support. Securely attach jack studs to supporting members.

E. Install headers in all openings that are larger than the stud spacing in that wall.

F. Attach bridging for studs in a manner to prevent stud rotation. Space bridging rows as shown.

G. Studs in one piece for their entire length, splices will not be permitted.

H. Provide joist bridging and web stiffeners at reaction points where shown.

I. Provide temporary bracing and leave in place until framing is permanently stabilized.

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

K. Fasten reinforcement plate over web penetrations that exceed size of manufacturer's standard punched openings.

3.3 TOLERANCES:

A. Vertical alignment (plumbness) of studs shall be within 1/960th of the span.

B. Horizontal alignment (levelness) of walls shall be within 1/960th of their respective lengths.

C. Spacing of studs shall not be more than 3 mm (1/8 inch) +/- from the designed spacing providing that the cumulative error does not exceed the requirements of the finishing materials.

3.4 FIELD REPAIR:

Touch-up damaged galvanizing with galvanizing repair paint.

END OF SECTION 054000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Model code evaluation reports for treated wood.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.

2.2 TREATED MATERIALS

A. Preservative-Treated Materials: AWPA C2, except that lumber not in ground contact and not exposed to the weather may be treated according to AWPA C31 with inorganic boron SBX.

1. Use treatment containing no arsenic or chromium.
2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

B. Provide preservative-treated materials for items indicated on Drawings, and the following:

1. Wood members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Concealed members in contact with masonry or concrete.
3. Wood framing members that are less than 18 inches above the ground.
4. Wood floor plates that are installed over concrete slabs-on-grade.

C. Fire-Retardant-Treated Materials: Comply with performance requirements in AWPA C20.

1. Use Exterior type for exterior locations and where indicated.
2. Use Interior Type A, High Temperature (HT) where indicated.
3. Use Interior Type A, unless otherwise indicated.
4. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.

D. Provide fire-retardant treated materials for items indicated on Drawings.

2.3 LUMBER

A Miscellaneous Lumber: No. 2 grade with 15 percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.

2.4 PLYWOOD BACKING PANELS

A. Telephone, Electrical Equipment and I.T. Backing Panels: Plywood, Exposure 1, C-D Plugged, fire-retardant treated, not less than 3/4 inch thick.

2.5 FASTENERS

A. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

1. Power-Driven Fasteners: CABO NER-272.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set miscellaneous rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Securely attach miscellaneous rough carpentry to substrates, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2).

END OF SECTION 061053

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Model code evaluation reports for exterior densglass gold sheathing and felt building wrap.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

A. Gypsum Wall Sheathing:

1 Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

2.2 MISCELLANEOUS PRODUCTS

A. Fasteners: Size and type indicated.

1. For roof parapet wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
2. Power-Driven Fasteners: CABO NER-272.

B Weather-Resistant Sheathing Paper:

1 Building Wrap: Dupont Tyvek Commercial Building Wrap or approved equal.

C. Sheathing Joint-and-Penetration Treatment Materials:

1. Sealant for Gypsum Sheathing Board: Joint sealant recommended by sheathing manufacturer for application indicated.
2. Sheathing Tape for Gypsum Sheathing Board: Grace Vycor plus self-adhered flashing tape & Grace Perm-A- Barrier WB Primer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Securely attach to substrates, complying with the following:

1 Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2).

B. Fastening Methods:

1 Wall and Roof Sheathing:
a Screw to cold-formed metal framing.

C. Sheathing Joint-And-Penetration Treatment: Grace Vycor plus self-adhered flashing tape & Grace Perm-A-Barrier WB Primer.

D. Building Wrap Installation: 1. SEE SECTION

072500 WEATHER BARRIERS.

END OF SECTION 061000

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data for solid-surfacing materials Shop Drawings and Samples showing the full range of colors, textures, and patterns available for each type of finish.

B. Quality Standard: Architectural Woodwork Institute's "Architectural Woodwork Quality Standards. Verify availability of certification in first paragraph below with local woodworkers before retaining.

C. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is completed, and HVAC system is operating.

D. Warranty- All work under this section shall be covered by a one year warranty on materials and workmanship. Warranty claims will result in no loss to the owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hardboard: AHA A135.4.

B. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.

C. Particleboard: ANSI A208.1, Grade M-2.

D. Softwood Plywood: DOC PS 1.

E. Hardwood Plywood and Face Veneers: HPVA HP-1, made with adhesive containing no urea formaldehyde.

F. Thermoset Decorative Panels: Comply with LMA SAT - 1.

G. High-Pressure Decorative Laminate: NEMA LD 3.

1. Products:

a. SEE FINISH PLAN DRAWINGS.

2.2 CABINET HARDWARE AND ACCESSORY MATERIALS

A. SEE SPECIFICATIONS ON ARCHITECTURAL DRAWINGS.

2.3 INTERIOR WOODWORK

A. Complete fabrication to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

B. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

C. Interior Standing and Running Trim for Transparent Finish: Premium grade, see drawings for species and stain color.

D. Plastic-Laminate Cabinets: Premium grade.

1. AWI Type of Cabinet Construction: Flush overlay AWI- 400G-1.
2. Laminate Cladding: Horizontal surfaces other than tops, HGS; postformed surfaces, HGP; vertical surfaces, VGS cabinet, door and drawer front edges- 3 mm matching edge band, semiexposed surfaces, VGS.
3. Drawer Sides and Backs: Solid hardwood.
4. Drawer Bottoms: Hardwood plywood.

E. Plastic-Laminate Countertops: Premium grade.

1. Laminate Grade: HGS for flat countertops, HGP for post-formed countertops.
2. Grain Direction: Parallel to cabinet fronts.
3. Edge Treatment: SEE ARCHITECTURAL DRAWINGS.

2.4 SHOP FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

A. Finishes: Same grades as items to be finished.

B. Finish architectural woodwork at the fabrication shop; defer only final touch up until after installation.

1. Apply one coat of sealer or primer to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces.
2. Apply a vinyl wash coat to woodwork made from closed-grain wood before staining and finishing.
3. After staining, if any, apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.

C. Transparent Finish: AWI finish system catalyzed polyurethane.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Install woodwork to comply with referenced quality standard for grade specified.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Fasten with countersunk concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed nailing, countersunk and filled flush with woodwork.

F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 36 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

G. Cabinets: Install so doors and drawers are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.

1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

H. Anchor countertops securely to base units. Seal space between backsplash and wall.

END OF SECTION 064023

SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 BITUMINOUS DAMPPROOFING

A. Cold-Applied, Emulsified-Asphalt Dampproofing:

1. Trowel Coats: ASTM D 1227, Type II, Class 1.
2. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
3. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

B. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

C. Apply dampproofing to footings and foundation walls where opposite side of wall faces building interior.

1. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches over outside face of footing.
2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

D. Apply dampproofing to provide continuous plane of protection on exterior face of inner wythe of exterior masonry cavity walls.

1. Lap dampproofing at least 3 inches onto flashing and items that penetrate inner wythe.

2 Extend dampproofing over outer face of structural members and concrete slabs.

E Apply dampproofing to provide continuous plane of protection on interior face of above-grade, exterior concrete and masonry walls unless walls are indicated to receive direct application of paint.

F. Cold-Applied Emulsified-Asphalt Dampproofing:

1. On concrete foundation walls, apply two brush or spray coats, one fibered brush or spray coat, or one trowel coat.
2. On unparged masonry foundation walls, apply primer and two brush or spray coats, primer and one fibered brush or spray coat, or primer and one trowel coat.

G. Contractor to notify VA representative of installation so that installation can be observed.

END OF SECTION 071113

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data Shop Drawings and product test reports.

B. Installer Qualifications: Authorized, approved, or licensed by waterproofing manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Flashing Description: 0.8mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mils) of cross-laminated, high density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.

B. Performance Requirements:

1. Water Vapor Transmission: ASTM E96, Method B - 2.9 ng/m2sPa (0.05 perms) maximum.
2. Water Absorption: ASTM D570 - Max. 0.1% by weight.
3. Puncture Resistance: ASTM E154 - 356 N (80 lbs).
4. Tear Resistance:
   a. Initiation - ASTM D1004 - min. 58 N (13.0 lbs) M.D.
   b. Propagation - ASTM D1938 - min. 40 N (9.0 lbs) M.D.
5. Lap Adhesion at -4ºC (25ºF): ASTM D1876 - 880 N/M (5.0 lbs/in.) of width.
6. Low Temperature Flexibity - ASTM D1970 - Unaffected to -43ºC (-45ºF).
7. Tensile Strength: ASTM D412, Die C Modified - Min. 5.5 MPa (800 psi).
8. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C - Min. 200%.

C. Product: Perm-A-Barrier® Wall Flashing manufactured by Grace Construction Products or approved equal.

D. Wall Flashing Accessories:

1. Surface Conditioner:
   a. Description: Water-based latex liquid for substrate preparation.
      (1.) Flash Point: No flash to boiling point
      (2.) Solvent Type: Water
      (3.) VOC Content. Not to exceed 125 g/L
      (4.) Application Temperature: -4ºC (25ºF) and above
      (5.) Freeze/Thaw Stability: 5 cycles min.

(6.) Freezing point (as packaged): -10ºC (14ºF)

b. Product: Perm-A-Barrier Surface Conditioner manufactured by Grace Construction Products.

2 Termination Mastic:

a. Description: Rubberized asphalt-based mastic with 200 g/L max. VOC Content.
b. Product: Bituthene® Mastic manufactured by Grace Construction Products or approved equal.

3 Optional Primer:

a Description: Water-based latex primer
(1.) Specially designed for glass mat surfaced exterior gypsum boards
(2.) VOC Content: Not to exceed 10 g/L

b. Product: Perm-A-Barrier WB Primer by Grace Construction Products or approved equal.

4 Optional Primer:

a. Description: Water-based latex primer with 110 g/L max. VOC content.
b. Product: Bituthene Primer WP-3000 by Grace Construction Products.

5 Optional Primer:

a. Description: Rubber-based primer in solvent with 440 g/L max. VOC content.
b. Product: Bituthene Primer B2 by Grace Construction Products or approved equal.

PART 3 - EXECUTION

31 EXAMINATION

A. Examine conditions, with installer present, for compliance with requirements for installation, tolerances and other specific conditions affecting performance of flashing. Remove all deleterious materials from surfaces to be flashed.

3.2 INSTALLATION

A. General: Install flashing to dry surfaces at air and surface temperatures of -4ºC (25ºF) and above in accordance with manufacturer's recommendations at locations indicated on Construction Documents.

B. Flexible Wall Flashing:

1. Precut pieces of flashing to easily handled lengths for each location.
2. Remove silicone-coated release paper and position flashing carefully before placing it against the surface.
3. When properly positioned, place against surface by pressing firmly into place by hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing.
4. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a steel hand roller.
5. Trim bottom edge 13 mm (1/2 in.) back from exposed face of the wall. Flashing shall not be permanently exposed to sunlight.

6. At heads, sills and all flashing terminations turn up ends a minimum of 50 mm (2 in.) and make careful folds to form an end dam, with the seams sealed.
7. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.
8. Do not expose flashing membrane to sunlight for more than thirty days prior to enclosure.

C Accessories:

1. When required by dirty or dusty site conditions or by surfaces having irregular or rough texture, apply surface conditioner by spray, brush, or roller at the rate recommended by manufacturer, prior to flashing installation. Allow surface conditioner to dry completely before flashing application.
2. Apply a bead of trowel of mastic along flashing top edge, seams, cuts, and penetrations.
3. Apply primer by brush or heavy nap, natural-material roller at rate recommended by manufacturer prior to flashing installation. Allow primer to dry completely before flashing application.

END OF SECTION 071326

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Surface-Burning Characteristics: ASTM E 84, and as follows:

1. Flame-Spread Index: 25 or less where exposed; otherwise, as indicated in Part 2 "Insulation Products" Article.
2. Smoked-Developed Index: 450 or less.

PART 2 - PRODUCTS

2.1 INSULATION PRODUCTS

A. Extruded-Polystyrene Board Insulation: ASTM C 578, with flame-spread index of 75 or less. (Styrofoam Blue Guard or architect approved equal.)

B. Mineral-Fiber-Blanket Insulation: ASTM C 665, foil faced on 1 side with fibers manufactured from glass, with flame-spread index of 25 or less.

2.2 UNDER-SLAB VAPOR BARRIER/RETARDER

A. Vapor Barrier

1 Vapor Barrier must have the following qualities

a. Water Vapor Transmission Rate ASTM E 96 0.0006 WVTR or lower
b. Water Vapor Barrier ASTM E 1745 Meets Class A (Plastics)

2 Vapor Barrier Products

a. Stego Wrap 15-mil Vapor Barrier by Stego Industries LLC.
b. Premoulded Membrane with Plasmatic Core by W.R. Meadows.
c. Zero-Perm by Alumiseal.

2.3 ACCESSORIES

A. Seam Tape

1. Tape must have the following qualities:
   a Water Vapor Transmission Rate ASTM E 96 0.3 perms or lower
2. Seam Tape
   a Stego Tape by STEGO INDUSTRIES LLC, San Juan Capistrano, CA (877) 464-7834, www.stegoindustries.com or approved equal.

B Vapor Proofing Mastic

1. Mastic must have the following qualities:
   a Water Vapor Transmission Rate ASTM E 96 0.3 perms or lower
2. M a s t i c
   a Stego Mastic by STEGO INDUSTRIES LLC, San Juan Capistrano, CA (877) 464-7834, www.stegoindustries.com or approved equal.

C. Pipe Boots

Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.

PART 3 - EXECUTION

3.1 INSTALLATION (INSULATION)

A. Install insulation in areas and in thicknesses indicated or required to produce R-values indicated. Cut and fit tightly around obstructions and fill voids with insulation.

B. Except for loose-fill insulation and insulation that is friction fitted in stud cavities, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

3.2 INSTALLATION (VAPOR BARRIER/RETARDER)

A. Install Vapor Barrier/Retarder:

1. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643-98.
   a. Unroll Vapor Barrier/Retarder with the longest dimension parallel with the direction of the pour.
   b. Lap Vapor Barrier/Retarder over footings and seal to foundation walls.
   c. Overlap joints 6 inches and seal with manufacturer's tape.
   d. Seal all penetrations (including pipes) per manufacturer's instructions.
   e. No penetration of the Vapor Barrier/Retarder is allowed except for reinforcing steel and permanent utilities.
   f. Repair damaged areas by cutting patches of Vapor Barrier/Retarder, overlapping damaged area 6 inches and taping all four sides with tape.

END OF SECTION 072100

SECTION 072500 – WEATHER BARRIERS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Weather barrier membrane
B. Seam Tape
C. Flashing
D. Fasteners

1.2 REFERENCES

A. ASTM International
1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
2. ASTM C1193; Standard Guide for Use of Joint Sealants
3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E96; Test Method for Water Vapor Transmission of Materials
7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
8. ASTM E2178; Test Method for Air Permeance of Building Materials

B. AATCC – American Association of Textile Chemists and Colorists
1. Test Method 127 Water Resistance: Hydrostatic Pressure Test

C. TAPPI
1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.3 SUBMITTALS

A. Refer to Contractor's Requirements.
B. Product Data: Submit manufacturer current technical literature for each component.
C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.
D. Quality Assurance Submittals
1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
2. Manufacturer Instructions: Provide manufacturer’s written installation instructions.
3. Manufacturer’s Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.

E. Closeout Submittals

1. Refer to Section [01 78 00 Closeout Submittals] [insert section number and title].
2. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.4 QUALITY ASSURANCE

A. Qualifications

1. Installer shall have experience with installation of commercial weather barrier assemblies under similar conditions.
2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
3. Source Limitations: Provide commercial weather barrier and accessory materials produced by single manufacturer.

B. Mock-up

1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
   a. Mock-up size: [10 feet by 10 feet]
   b. Mock-up Substrate: Match wall assembly construction, including window opening.
   c. Mock-up may remain as part of the work.
2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.

C. Pre-installation Meeting

1. Refer to Project Meetings.
2. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, Engineer, Installer, Owner's Representative, and Weather Barrier Manufacturer's Designated Representative.
3. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.5 DELIVERY, STORAGE AND HANDLING

A. Refer to Product Requirements.

B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store weather barrier materials as recommended by weather barrier manufacturer.

1.6 SCHEDULING

A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

1.7 WARRANTY

A. Refer to Warranties.

B. Special Warranty

1. Special weather-barrier manufacturer's warranty for weather barrier assembly for a period of ten (10) years from date of final weather barrier installation.
2. Approval by weather barrier manufacturer for warranty is required prior to assembly installation.
3. Warranty Areas: ALL EXTERIOR WALL AND WINDOW LOCATIONS.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. DuPont Building Innovations; 4417 Lancaster Pike, Chestnut Run Plaza 721, Wilmington, DE 19805; 1.800.44TYVEK (8-9835); http://construction.tyvek.com

2.2 MATERIALS

A. Basis of Design: High-performance, spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® and related assembly components.

B. Performance Characteristics:

1. Air Penetration: 0.001 cfm/ft^2 at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
3. Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.
4. Basis Weight: 2.7 oz/yd^2, when tested in accordance with TAPPI Test Method T-410.
5. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
6. Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

2.3 ACCESSORIES

A. Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape for commercial applications.

B. Fasteners:

1. DuPont™ Tyvek® Wrap Cap Screws, as manufactured by DuPont Building Innovations: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer

C. Sealants

1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
2. Products:
   a. Tremco 830
   b. Tremco Butyl
   c. Sealants recommended by the weather barrier manufacturer.

D. Adhesives:

1. Provide adhesive recommended by weather barrier manufacturer.
2. Products:
   a. Liquid Nails® LN-109
   b. Polyglaze® SM 5700
   c. Denso Butyl Liquid
   d. 3M High Strength 90
   e. SIA 655
   f. Adhesives recommend by the weather barrier manufacturer.

E. Primers:

1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
2. Products:
   a. 3M High Strength 90
   b. Denso Butyl Spray
   c. SIA 655
   d. Permagrip 105
   e. ITW TACC Sta' Put SPH
   f. Primers recommended by the flashing manufacturer

F. Flashing

1. DuPont™ FlexWrap™, as manufactured by DuPont Building Innovations: flexible membrane flashing materials for window openings and penetrations.

AND/OR

2. DuPont™ StraightFlash™, as manufactured by DuPont Building Innovations: straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.

AND/OR

3. DuPont™ StraightFlash™ VF, as manufactured by DuPont Building Innovations: dual-sided straight flashing membrane materials for brick mold and non-flanged windows and doors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.2 INSTALLATION - WEATHER BARRIER

A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

B. Install weather barrier prior to installation of windows and doors.

C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.

E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.

F. Window and Door Openings: Extend weather barrier completely over openings.

G. Overlap weather barrier

1. Exterior corners: minimum 12 inches.
2. Seams: minimum 6 inches.

H. Weather Barrier Attachment:

1. Attach weather barrier to ICF. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along ICF, and 24 inch on center, maximum horizontally.

I. Apply 4 inch by 7 inch piece of DuPont™ StraightFlash™ to weather barrier membrane prior to the installation cladding anchors.

3.3 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

3.4 OPENING PREPARATION (for use with non-flanged windows - all cladding types)

A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.5 FLASHING (for use with non-flanged windows - all cladding types)

A. Cut 9-inch wide DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening. Apply

primer as required by manufacturer.

B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

D. Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start DuPont™ StraightFlash™ at head of opening and lap sill flashing down to the sill.

E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.

F. Install DuPont™ FlexWrap™ at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

G. Coordinate flashing with window installation.

H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.

I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

J. Tape top of window in accordance with manufacturer recommendations.

K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.6 OPENING PREPARATION (for use with flanged windows)

A. Cut weather barrier in a modified "I-cut" pattern.

1. Cut weather barrier horizontally along the bottom of the header.
2. Cut weather barrier vertically 2/3 of the way down from top center of window opening.
3. Cut weather barrier diagonally from bottom of center vertical cut to the left and right corners of the opening.
4. Fold side and bottom weather barrier flaps into window opening and fasten.

B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.7 FLASHING (for use with flanged windows)

A. Cut 9-inch wide DuPont™ FlexWrap™ a minimum of 12 inches longer than width of sill rough opening.

B. Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.

D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and

head. Do not apply sealant across sill.

E. Install window according to manufacturer's instructions.

F. Apply 4-inch wide strips of DuPont™ StraightFlash™ at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.

G. Apply 4-inch wide strip of DuPont™ StraightFlash™ as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.

H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

I. Tape head flap in accordance with manufacturer recommendations.

J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.8 FIELD QUALITY CONTROL

A. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.9 PROTECTION

A. Protect installed weather barrier from damage.

END OF SECTION 072500

SECTION 074213 – ENGINEERED ARCHITECTURAL WALL SYSTEM - ROUTE AND RETURN SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Section Includes: Laminated panels and attachment systems for use as exterior cladding.

1.2 RELATED SECTIONS

A. Section 05100: Structural Framing

B. Section 06100: Back Up Walls

C. Section 07299: Insulation

D. Section 07600: Metal Flashing

E. Section 07920: Sealants

F. Section 09200: Finishes

1.3 SYSTEM DESCRIPTION

A. Panel's exposed finishes shall perform according to AAMA 2605-98; exposed anodized aluminum according to AAMA 611-98.

B. Panel composite assembly shall conform to ASTM E84, Flame Spread Resistance, Class A.

C. Panel composite assembly shall pass Modified ASTM E108, External Flame Resistance.

D. Panel composite assembly shall pass UBS 26-3, Fire Standard for Interior Applications.

E. Panel bond integrity shall have a minimum peel strength of 34.5 in-lbs/in when tested according to ASTM D1781.

F. Design wall system to withstand a positive and negative windload pressure acting inward and outward normal to the place of the wall to meet the requirements of the latest adopted Local Building Code.

G. Make adequate provisions in the wall system for thermal expansion and contraction of the component parts and fastening of the system to prevent harmful damage caused by buckling, opening of joints, contraction and expansion due to accumulation of dead loads and variations of live loads, in accordance with ASTM E72, Strength Tests For Panels For Building Construction.

H. Water Leakage: No water infiltration into the panel system under static pressure when tested in accordance with ASTM E331 at a differential of 10% of inward acting design load, 6.24 psf (.299 kPa) minimum, after 15 minutes.

I. Air Leakage: Not more than 0.06 (cfm)/sf of wall area (.003 (L/s) m^2), when tested at 1.57 psf (.075 kPa) in accordance with ASTM E283.

1.4 QUALITY ASSURANCE

A. Panel Manufacturer: Manufacturer shall have a minimum of ten (10) years experience in the manufacture of ACM/MCM and have ISO 9001:2000 Certification.

B. Panel Installer: Installer shall have minimum two (2) years experience in performing work of this section and be specialized in the installation of similar work required on this project. A written recommendation from the system manufacturer listing prior jobs and approval of this installer with their system.

C. Field Measurements: When possible, measurements should be taken prior to the completion of shop manufacturing and assembly.

D. Pre-Installation Meetings: Conduct pre-installation meetings to verify project requirements, substrate condition, installation instructions and warranty requirements. Comply with Division 1 Project Management and Coordination, Project Meetings Section.

1.5 REFERENCES

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

ASTM E84: Surface Burning Characteristics
ASTM D1781: Climbing Drum Peel for Adhesives
ASTM E108 (Modified): Standard Test Methods for Fire Tests of Roof Coverings
ASTM E72: Strength Tests for Panels for Building Construction
ASTM E331: Test for Water Penetration of Exterior Walls by Uniform Static Air Pressure Difference
ASTM E283: Test Method for Rate of Air Leakage through Exterior Walls

B. Architectural Aluminum Manufacturer's Association (AAMA):

AAMA 2605-98: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
AAMA 611-98: Voluntary Specification for Anodized Architectural Aluminum

C. UBC26-3: Room Fire Test Standard for Interior of Foam Plastic Systems

1.6 SUBMITTALS

A. Samples:

Panel: Two samples of each type of assembly.
Color Standards: Two 3" x 5" samples of each color of finish selected.

B. Shop Drawings: Indicate thickness and dimension of parts, fastening and anchoring methods, detail and location of joints, including joints necessary to accommodate thermal movement.

C. Material Certification: Two (2) copies certifying that material meets the requirements specified.

D. Manufacturer's Literature: Two (2) copies of manufacturer's literature for panel material.

E. Test Reports: Two (2) copies of third party test reports on testing required in Section 1.3.

1.7 DELIVERY, STORAGE AND HANDLING

A. General: Comply with Division 1 Product Requirements Section.

B. Deliver, store and handle panels and other components so they will not be damaged or deformed. Package all panels for protection against transportation damage.

C. Storage and Protection: Stack materials on platforms or pallets, covered with suitable ventilated covering. Do not store panels to accumulate water or be in contact with other materials that might cause staining, denting or other surface damage.

1.8 WARRANTY

A. Manufacturer's Warranty: Furnish panel manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not a limitation of other rights Owner may have under the Contract Documents.

B. Panel Lamination Warranty: Ten (10) years commencing on Date of Substantial Completion.

C. Finish Warranty: Anodized: Twenty (20) years.

PART 2 - PRODUCTS

2.1 EXTERIOR WALL PANELS & SYSTEMS

A Manufacturer:

Citadel Architectural Products, Inc. or approved equal.
3131-A North Franklin Road
Indianapolis, Indiana 46226
phone: (317) 894-9400
(800) 446-8828
fax: (317) 894-6333
(800) 247-2635
www.citadelap.com
info@citadelap.com

B. Envelope 2000®

Engineered Architectural Wall System

1. Panel Composition:

a. Face Skin: .024" to .040" prefinished smooth aluminum, clear anodized aluminum & Megaflon as selected by architect.
b. Core: .105" thermoset phenolic resin
c. Back Skin: .010" primed smooth aluminum backer.

2. Panel Tolerances:
   a. Thickness: +/- 1/32"
   b. Length and Width: +, -1/16"
   c. Squareness: 1/64" per lineal foot

3. Attachment System: RR System

2.2 SUBSTITUTIONS

A. Acceptable Alternatives: Panels of similar composition providing manufacturer has a minimum of ten (10) years experience.

B. The materials and products specified in this section establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

C. No substitution will be considered unless written request for approval has been submitted by the bidder and has been received by the Architect ten (10) days prior to the date for receipt of bids.

D. Each request shall include the name of the materials and a complete description of the proposed material, including test performance and any other information necessary for evaluation.

2.3 FINISH

A. Exposed Finish: Clear Anodized as selected by architect.

24 ACCESSORIES

A. Fasteners and moldings as required for panel system's design by panel system manufacturer. Fasteners shall be coated or stainless steel.

B. Weather Seals: Shall be Tremco® Spectrem® 2 or Dow Corning 795TM, applied per the sealant manufacturer's instructions or as recommended by selected panel manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine and verify substrate surfaces to receive composite metal panel system and associated work and condition which work will be installed.

B. Maximum deviation from vertical and horizontal alignment of substrate shall be no more than 1/4" in 20'-0".

C. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer. Starting work within a particular area will be construed as installer's acceptance of surface conditions.

3.2 PREPARATION

A. Comply with manufacturer's product data including product technical bulletins, product catalog installation instructions, and product carton instructions.

B. Surfaces to receive panels shall be even, smooth, sound, clean, and free from defects detrimental to panel installation.

C. Field measure and verify dimensions as required.

D. Protect adjacent areas or surfaces from damage as a result of the Work of this Section.

3.3 INSTALLTION

A. Sheathing and water resistant membrane (if specified) by others.

B. Erect panels level and true to intended plane.

C. Anchor panels securely in place in accordance with manufacturer's/fabricator's approved Shop Drawings.

D. Maximum deviation from vertical and horizontal alignment of erected panels shall be no more than 1/4" in 20'-0".

E. Maximum deviation in panel flatness shall be 0.6% of the assembled units.

F. Conform to panel manufacturer's instructions for attachment systems.

G. Weather seal all joints as required using methods and materials as recommended by the panel manufacturer/fabricator.

3.4 CLEANING

A. Remove temporary coverings and protection to adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.

B. Remove and legally dispose of construction debris from project site.

END OF SECTION 074213

SECTION 074243 – OPAQUE GLAZING PANELS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Section Includes: Laminated panels for use as glazing infill or railing-type channel inserts.

1.2 RELATED SECTIONS

A. Section 05100: Structural Framing

B. Section 06100: Back Up Walls

C. Section 07299: Insulation

D. Section 07600: Metal Flashing

E. Section 07920: Sealants

F. Section 09200: Finishes

1.3 SYSTEM DESCRIPTION

A. Panel's exposed finishes shall perform according to AAMA 2603-98 or AAMA 2605-98; exposed anodized aluminum according to AAMA 611-98; exposed porcelain enamel steel according to PEI S-100.

B. Panel composite assembly shall conform to ASTM E84, Flame Spread Resistance, Class A.

C. Design wall system to withstand a positive and negative windload pressure acting inward and outward normal to the plane of the wall to meet the requirements of the latest adopted Local Building Code.

D. Make adequate provisions in the wall system for thermal expansion and contraction of the component parts and fastening of the system to prevent harmful damage caused by buckling, opening of joints, contraction and expansion due to accumulation of dead loads and variations of live loads.

E. Design wall system to be sealed at all joints, intersections and cutouts to prevent moisture intrusion of any type.

1.4 QUALITY ASSURANCE

A. Panel Manufacturer: Manufacturer shall have a minimum of ten (10) years experience in the manufacture of composite architectural wall systems and must have ISO 9001:2000 Certification.

B. Panel Installer: Installer shall be experienced in performing work of this section and be specialized in the installation of similar work required on this project.

C. Field Measurements: When possible, measurements should be taken prior to the completion of shop manufacturing and assembly.

D. Pre-Installation Meetings: Conduct pre-installation meetings to verify project requirements, substrate condition, installation instructions and warranty requirements. Comply with Division 1 Project Management and Coordination, Project Meetings Section.

1.5 REFERENCES

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

ASTM E84: Surface Burning Characteristics

B. Architectural Aluminum Manufacturer's Association (AAMA):

AAMA 2603-98: Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels
AAMA 2605-98: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels
AAMA 611-98: Voluntary Specification for Anodized Architectural Aluminum

1.6 SUBMITTALS

A. Samples:
Panel: Two samples of each type of assembly.
Color Standards: Two 3" x 5" samples of each color of finish selected.

B. Shop Drawings: Indicate thickness and dimension of parts, fastening and anchoring methods, detail and location of joints, including joints necessary to accommodate thermal movement.

C. Material Certification: Two (2) copies certifying that material meets the requirements specified.

D. Manufacturer's Literature: Two (2) copies of manufacturer's literature for panel material.

E. Test Reports: Two (2) copies of third party test reports on testing required in Section 1.3.

17 DELIVERY, STORAGE AND HANDLING

A. General: Comply with Division 1 Product Requirements Section.

B. Delivery: Package all panels for protection against transportation damage in accordance with manufacturer's requirements.

C. Storage: Store all materials in accordance with manufacturer's installation instructions. Stack materials on pallets or platforms, covered with suitable ventilated covering. Do not store panels where accumulation of water may occur or in contact with other materials that might cause staining, denting or other damage.

D. Handling: All materials should be handled in a manner to prevent damage to the product in accordance with manufacturer's installation instructions.

18 WARRANTY

A. Manufacturer's Warranty: Furnish panel manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not a limitation of other rights Owner may have under the Contract Documents.

B. Panel Lamination Warranty: Five (5) years commencing on Date of Substantial Completion.

C. Finish Warranty: Anodized: Twenty (20) years.

PART 2 - PRODUCTS

21 EXTERIOR WALL PANELS & SYSTEMS

A. Manufacturer:

Citadel Architectural Products, Inc. or approved equal.
3131-A North Franklin Road
Indianapolis, Indiana 46226
phone: (317) 894-9400
(800) 446-8828
fax: (317) 894-6333
(800) 247-2635
www.citadelap.com
info@citadelap.com

B. GlazeGuard® 1000 WR Water

Resistant Opaque Glazing Panels

1. Panel Composition:
   a. Face Skin: .024" (minimum) prefinished smooth aluminum, clear anodized aluminum finish.

b. Core: 5/8" isocyanurate (ISO) foam
d. Back Stabilizer: 4mm high density polypropylene
c. Back Skin: .024" (minimum) prefinished smooth aluminum, clear anodized aluminum.

2. Panel Tolerances:
   a. Thickness: +/- 1/32"
   b. Length and Width: +, -1/8"
   c. Squareness: 1/64" per lineal foot

3. Attachment System: To be used as glazing infill or inserted into encapsulating watertight channel.

2.2 SUBSTITUTIONS

A. Acceptable Alternatives: Panels of similar composition providing manufacturer has a minimum of ten (10) years experience.

B. The materials and products specified in this section establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

C. No substitution will be considered unless written request for approval has been submitted by the bidder and has been received by the Architect ten (10) days prior to the date for receipt of bids.

D. Each request shall include the name of the materials and a complete description of the proposed material, including test performance and any other information necessary for evaluation.

2.3 FINISH

A. Exposed Finish: Exterior and Interior Face- Clear Anodized Aluminum

2.4 ACCESSORIES

A Weather Seals: Shall be Tremco® Spectrem® 2, applied per the sealant manufacturer's guidelines and in accordance with the panel manufacturer's installation instructions or as recommended by selected panel manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine and verify substrate surfaces to receive composite metal panel system and associated work and condition which work will be installed.

B. Maximum deviation from vertical and horizontal alignment of substrate shall be no more than 1/4" in 20'-0".

C. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer. Starting work within a particular area will be construed as installer's acceptance of surface conditions.

3.2 PREPARATION

A. Comply with manufacturer's product data including product technical bulletins, product catalog installation instructions, and product carton instructions.

B. Surfaces to receive panels shall be even, smooth, sound, clean, and free from defects detrimental to panel installation.

C. Field measure and verify dimensions as required.

D. Protect adjacent areas or surfaces from damage as a result of the Work of this Section.

3.3 INSTALLTION

A. Erect panels level and true to intended plane.

B. Maximum deviation from vertical and horizontal alignment of erected panels shall be no more than 1/4" in 20'-0".

C. Maximum deviation in panel flatness shall be 0.6% of the assembled units.

D. Conform to panel manufacturer's instructions for attachment systems.

E. Weather seal all joints as required using methods and materials as recommended by the panel manufacturer/fabricator.

3.4 CLEANING

A. Remove temporary coverings and protection to adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.

B. Remove and legally dispose of construction debris from project site.

END OF SECTION 074243

SECTION 075423
MECHANICALLY ATTACHED TPO ROOFING

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. Applicator qualifications: Manufacturer authorized roofing installer.

B. Design Criteria:
1. SPRI: "Wind Load Design Guide for Low Sloped Flexible Membrane Roofing Systems."
2. Factory Mutual (FM) Research Corporation: "Loss Prevention Data Sheets 1-28, 29, and 49."

C. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.

D. Material Standards:
1. TPO Membrane: ASTM-D6878.

1.2 DESIGN RESPONSIBILITY AND CRITERIA

A. Determine the fastener type and spacing needed to resist uplift pressures based "Wind Load Design Guide for Low Sloped Flexible Membrane Roofing Systems" published by SPRI.
1. Basic Wind Speed (site specific):
2. Exposure (site specific):
3. Importance Factor (site specific):
4. Roof Height(s) and Parapet Height(s): As indicated.
5. Static Pressure of Building Interior: < 0.5 IN water.

B. Fire resistance rating:
1. UL 790, Class A.
2. Assembly in conformance with fireproofing as specified.

1.3 SUBMITTALS

A. Shop Drawings:
1. Roof layout showing insulation thicknesses and special details.
2. Profiles of flashing assemblies.
3. Installation Drawings and pertinent details.
4. Indicate location of expansion joints, crickets, saddles, curbs, safety tiebacks, vents, drains and other penetrations.
5. Indicate slope amount and direction, locations of crickets, and key vertical elevation points.

B. Samples:
1. 5 IN x 5 IN specimens of sheet goods.
2. Color swatches of sheet metal colors for pre-selection.
3. 3 IN x 5 IN samples of sheet metal color(s) for final approval.

C. Project Information:
1. Meeting minutes from pre-installation meeting.
2. Report by manufacturer's representative that roof has been properly installed.
3. Report showing physical properties of materials.

D. Contract Closeout Information:
1. Warranty.
2. Maintenance Data:
   a. Include cleaning instructions.
3. Certificates.

1.4 WARRANTY

A. 20-year warranty of weathertightness signed by roofing materials manufacturer.
1. Warranty to include coverage for peak gusts of wind to:
a. 55 MPH at 33 FT above ground.
2. Warranty to include the entire system: membrane, flashings, adhesives, sealants, counterflashings, insulation, fasteners, fastener plates, fastener strips, hard rubber or metal edging, metal termination bars, sheet metal copings and edge metal, and other material authorized by manufacturer.

B. 20-year warranty on 70% PVDF (Kynar 500) coatings on edge metal and copings.

1.5 PRE-INSTALLATION MEETING

A. Pre-installation meeting, directed by Contractor, prior to beginning of roofing work to discuss following:
1. Contract Document requirements.
2. Roof plan.
3. Roofing and flashing details.
4. Drain and scupper elevations.
5. Roofing manufacturer s specifications and details.
6. UL requirements.
7. Insulation manufacturer s recommendations.
8. Available on site storage.
9. Roof protection from damage by other trades.

B. Attendance is recommended for:
1. Contractor.
2. Roofing installer s superintendent.
3. Roofing manufacturer s representative.
4. Sheet metal installer performing metal flashing work.
5. Mechanical installer.
6. Plumbing installer.
7. Deck installer.
8. Other trades whose work may affect roofing system.
9. VA Representative

C. Minimum two weeks prior to meeting forward pertinent information to Contractor for review.
1. Installation drawings.
2. Manufacturer product data.
3. Samples of proposed materials.
4. Sample warranty.
5. Other information deemed pertinent for sound and secure application.

D. Include review of specifications, details, application requirements and preliminary work.

E. Objectives of pre-installation meeting to include:
1. Review foreseeable methods and procedures related to roofing work.
2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.
3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
4. Review roofing system requirements (drawings, specifications and other contract documents).
5. Review required submittals both completed and yet to be completed.
6. Review and finalize construction schedule related to roofing work and verify availability of materials, installers personnel, equipment and facilities needed to make progress and avoid delays.
7. Review required inspection, testing, certifying and material usage accounting procedures.

8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
   a. Review notification procedures for weather or non-working days.
9. Record discussion of conference including decisions and agreements (or disagreements) reached.
   a. If substantial disagreements exist at conclusion of meeting, determine how disagreements will be resolved and set date for reconvening meeting.

F. Furnish copy of record to each party who may be affected by roofing work, (whether or not they were in attendance) and to Owner and Architect.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver to site in original, unopened containers labeled with the manufacturer's name, brand and installation instructions.

B. Store cleaners and adhesive products, liquid materials and un-cured materials at temperatures between 60 and 80 degF.
   1. When stored at lower temperatures, liquid materials must be restored to at least 60 degF prior to use.
   2. Protect from damage during storage.

C. Insulation, sheathing, and cover boards:
   1. Store on palettes off the ground.
   2. Cover with a breathable water tight membrane.

D. Lightweight materials shall be weighted down to prevent wind damage.

1.7 JOB CONDITIONS

A. When positioning membrane sheets, exercise care to locate field splices away from low spots and out of drain sumps.
   1. All field splices should be shingled to prevent bucking of water.

B. When loading materials onto the roof, the Applicator must comply with the requirements of the Owner to prevent overloading and possible disturbance to the building structure.

C. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.

D. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.

E. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

F. Only install insulation that can be roofed over and sealed in same day.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acceptable Manufacturers:
   1. Roofing materials:
      a. Base:
         1) Carlisle SynTec.
      b. Optional:
         1) Firestone Building Products.

2) GenFlex Roofing Systems.
3) Dow, Stevens.

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4) Versico.

2. Vapor Retarder (VR):
a. Base: 1) Griffolyn (Reef Industries).
b. Optional:
1) Fortifiber, with tape by Ideal.
3. Other Materials:
a. Base:
1) Manufacturers as noted.
4. Other manufacturers desiring approval comply with Section 00440.

2.2 SCHEDULE OF ROOF SYSTEM(S)

A. Roof System 1 – .060 min. TPO over Steel Deck:
1. Gypsum Sheathing.
2. Vapor Retarder.
3. TPO Membrane .060 min.

2.3 GENERAL

A. General:
1. All components products made by, or accepted as "compatible" by membrane manufacturer.
2. Unless otherwise approved by the specifier and accepted by the membrane manufacturer, products (including insulation, fasteners, fastening plates and edgings) must be manufactured and supplied by the roofing system manufacturer and covered by the warranty.

2.4 SHEATHING

A. Gypsum Sheathing (parapets):
1. Water-resistant gypsum core with fiberglass facings.
2. Minimum Thickness:
a. 5/8 IN.
3. Base Product: "Dens-Deck Roof Board" by Georgia-Pacific.

2.5 VAPOR RETARDER

A. Vapor Retarder:
1. Two plies of polyethylene, bonded over one layer of scrim reinforcing.
2. Fire retardant type, with compatible fire retardant adhesive.
3. Base Product: "TX-1200 FR" by Griffolyn.

4. Minimum Properties:

Minimum Physical Properties - Vapor Retarder

Property	Test Method	Required Value
Puncture Propagation Tear	ASTM-D256	26 LBS
Permeance	ASTM-E96	0.036 Perm (US)
Drop Dart	ASTM-D1709, Method B	330 g
Tensile Strength	ASTM-D882	100 LBS / 4,504 PSI
Puncture Strength	ASTM-D4833	26 LBS
Surface Burning Characteristics	ASTM-E84	Class I, Class A

5. Seaming Tape:
   a. Self-adhering, asphaltic mastic.
   b. Base Product: "Fab Tape" by Griffolyn.
6. Repair Tape, for punctures and other damaged areas:
   a. Base Product: "Griff Tape" by Griffolyn.

2.6 ROOF INSULATION

A. General:
1. Furnished by roofing manufacturer.
2. UL listed for assembly indicated.
3. Provide crickets and saddles as required.
4. Insulation shall be installed in multiple layers with joints staggered.
   a. Where no Sheathing is specified over Metal Decking: The thickness of the first layer shall exceed the maximum rib-to-rib span of the decking by at least 2 times.
   b. The first and second layer of insulation shall be mechanically fastened or adhered to the substrate in accordance with the manufacturer's published specifications.

B. Polyisocyanurate (PISO) roof insulation:
1. Rigid, closed cell foam core bonded to heavy-duty glass fiber mat facers.
2. Material complying with:

Minimum Physical Properties Polyisocyanurate Insulation Property	Test Method	Required Value
Material Standards	ASTM-C1289	Type II, Class 1
	HH-I-1972	Class 1
Density (nominal)	ASTM-D1622	2 PCF
Long Term Thermal Resistance (LTTR) per unit thickness	CAN / ULC-S770	6.0 R per IN
Compressive Strength	ASTM-D1622	20 PSI
Dimensional Stability	ASTM-D2126	2% max., 7 days
Permeance	ASTM-E96	<1.0 Perm (US)
Water Absorption	ASTM-C209	< 1.5% volume
Service Temperature	--	-100 to +250 DegF

3. Minimum Insulation Thickness:
   a. Areas where "Tapered" insulation is indicated:
      1) Minimum R=15 at roof drains.
      2) Taper to provide slope of 1/4 IN per FT.
4. Base Product: "Sure-Seal Polyisocyanurate HPH" by Carlisle SynTec.

2.7 ROOFING MEMBRANE

A. TPO Roofing membrane:
1. Material: Thermoplastic Polyolefin (TPO) single-ply roofing membrane.
   a. Fire Retardant.
   b. Polyester fabric reinforced.
2. Color: White.
3. Thickness: 60 mil thick.
4. Base Product: "SureWeld" by Carlisle SynTec.
5. Minimum Physical Properties:

Minimum Physical Properties 60mil, Reinforced, TPO Membrane

Property	Test Method	Required Value
Tolerance on Nominal Thickness (Max)	ASTM-D751	+/- 10%
Thickness over scrim (Min)	ASTM-D4637	15 mil
	Optical	18 mil
Breaking Strength (Min)	ASTM-D751	225 LBS
	Grab Method	340 LBS
Ultimate Elongation – Fabric Failure (Min)	ASTM-D751	25%
Tear Strength (Min)	ASTM-D751	55 LBS
	B Tongue Tear	130 LBS
Linear Dimensional Change (Shrinkage)	ASTM-D1204	+/- 1.0%
Field Seam - Peel Strength (min)	ASTM-D1876	40 LBS/IN
Permeance (max)	ASTM-E96	<0.1 Perm (US)
Puncture Resistance (min)	FTM 101C Method 2031	250 LBS
Solar Reflectance (albedo X 100)	ASTM-E903	80 (White Membrane)
		25 (Gray Membrane)
Brittleness Point	ASTM-D2137	-40 DegF

B. Membrane flashings, fasteners, adhesives, tapes, cements and sealants: Roofing manufacturer's standard.

2.8 EDGE METAL AND COPING

A. General:
1. Roofing Manufacturer's pre-engineered, prefabricated system for termination of roofing membrane. Reference Section 07600 for additional requirements.
2. All fasteners must be concealed from view.
3. Concealed splice plates, with color matching snap-on covers.
4. Anchor cleats:
   a. Material: G90 galvanized steel.
   b. Thickness: 20 GA.
   c. Continuous cleat on internal and external leg required.
5. Snap-on cover:
   a. Material: G90 galvanized steel.
6. Snap-on cover:
   a. Material: G90 galvanized steel.
   b. Thickness:
      1) For dimensions less than 10 IN: 24 GA.
      2) For dimensions 10 to 24 IN22 GA.
   c. Finish: 70% PVDF Kynar 500.
   d. Color:
      1) To be selected from manufacturers standard colors by Architect.
7. Wind Rating: Design for same FM design pressure indicated for balance of roof system.
8. Coverage of these items to be included in roof system warranty.

9. Comply with applicable FM and SPRI standards.

B. Roof Edge/Fascia:
1. Match profiles indicated.
2. Include accessories such as pre-fabricated inside and outside corners, Spillout, Overflow and Downspout Scuppers, Edging Extensions, Fascia Sumps, and other items indicated.
3. Base Product: "SecurEdge 200 Fascia" by Carlisle SynTec.

C. Coping:
1. Match profiles indicated.
2. Include accessories such as pre-fabricated inside and outside corners (seamed), End Caps, Saddles, Tee's, Crosses, Transition Pieces and Radiused Copings, and other items indicated.
3. Base Product: "SecurEdge 200 Coping" by Carlisle SynTec.

2.9 FASTENERS

A. Type, spacing and quantity as recommended by manufacturer.
1. Designed to resist uplift forces generated by specified wind speed.

B. Minimum pullout values per fastener:
1. For use with 22 GA steel decks: 350 LBS each.
2. For use with normal weight concrete decks: 800 LBS each.

C. Fasteners shall be capable of providing a static back-out resistance of at least 10 IN-LBS.

2.10 MISCELLANEOUS ITEMS

A. Roofing accessories:
1. Use manufacturer's standard prefab accessories where available.
2. Nailing strips: As detailed and required.
3. Pipe flashings: Provide for each pipe penetration; include clamps, adhesive and sealants.
4. Expansion joint covers.
5. Underlayment for pavers: As recommended by roofing manufacturer.

B. Adhesives, cleaners, and primers: As recommended by roofing manufacturer.

C. Treated Wood Blocking: Specified in Section 06000.

D. Other Materials as required by manufacturer for complete system warranty.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect entire area to be roofed for acceptability.

B. Correct, or have corrected, unsatisfactory conditions.

3.2 PREPARATION

A. Remove standing water from area to be covered prior to starting roofing work.

B. Install required nailers.

C. Clear the deck of debris, ice, water and foreign material prior to installation of any roofing materials.

D. Commencement of roof installation indicates contractors acceptance of substrate condition.

3.3 INSTALLATION OF ROOFING - GENERAL

A. Install materials in accordance with manufacturer's instructions and recommendations.

B. Fasteners which will be exposed to view from finished spaces below:

1. Project fastener through roof deck maximum 1 IN and cap.

C. Comply with the manufacturers instructions for the installation of the membrane roofing system including proper substrate preparation, jobsite considerations and weather restrictions.

D. Install materials in accordance with procedures required for FM and UL assemblies.

3.4 INSTALLATION OF NAILERS

A. Install nailers at perimeter of each roof level, curbs, skylights, expansion joints, and similar penetrations.

3.5 INSTALLATION - VAPOR RETARDER

A. Install in accordance with manufacturers instructions.

B. Ensure that surface beneath vapor retarder is smooth with no sharp projections.

C. Do not proceed until deficiencies are corrected.

D. Install in largest practical widths.

E. Install continuously at locations indicated.
1. Insure that no discontinuities occur, including at seams, penetrations, and edge terminations.
2. Join sections of vapor retarder and seal penetrations with mastic tape.
3. Lap joints 4 IN and seal with adhesive.
4. Ensure that surfaces to be taped are clean and dry.

F. Seal around pipes, conduits, curbs, safety tie-backs, and other penetrations with pipe boots in accordance with manufacturers instructions.

G. Maintain continuity of vapor retarder over expansion joints.

H. Repair holes in vapor retarder with self-adhesive tape recommended by manufacturer.

I. Protect vapor retarder from damage until covered with insulation.

3.6 INSTALLATION - WOOD BLOCKING

A. Install where indicated or required for proper securement of roofing system.

B. Securement of wood blocking: 1. Design to resist a minimum of 200 LBS/LF in any direction per SPRI Test Method RE-1.

C. Install so that top of blocking is substantially flush (+/- 1/4 in.) with top of insulation.

3.7 INSTALLATION - INSULATION

A. Where required thickness of insulation is greater than 2 IN: Install insulation in at least two layers. Insulation at roof drains and low valleys must be a minimum of two staggered layers of insulation with joints offset at least 6 in.
1. Stagger board joints in successive layers laterally, and longitudinally.
2. Butt joints tightly, and dress top surface of joints as required to preclude ponding at seams.
a. Joints shall not exceed 1/4 in.
b. Joints and gaps greater than 1/4 in. shall be filled with the same material.
3. Cut insulation neatly to fit around roof penetrations and projections.

B. Secure insulation to the substrate with the required mechanical fasteners (or adhesive) in accordance with the manufacturers specifications.
1. Cut insulation neatly to fit around roof penetrations and projections.
2. Install Cover Board continuously over insulation.
3. Mechanically fasten (or adhere) insulation to deck to UL and FM requirements. a. Where Cover Board is specified, fastener shall be attached through the cover board and layers of insulation.

C. Fasteners which will be exposed to view from finished spaces below:
1. Project fastener through roof deck maximum 1 IN.

3.8 INSTALLATION - MEMBRANE

A. General:
1. Unroll and position membrane without stretching.
2. Secure the membrane with the required fasteners and plates.
a. Spacing as dictated by wind design and project conditions.
3. Install adjoining membrane sheets in the same manner in accordance with the manufacturers requirements.
4. Position sheets to accommodate contours of roof deck.
a. Shingle splices to avoid bucking water.
5. Perimeter Securement: Secure membrane along the perimeter of each roof level, roof section, curb, skylight, interior wall, penthouse, and other penetrations as recommended by membrane manufacturer.
6. Hot or Cold Weather Procedures: Comply with manufacturers instructions.
7. Protect membrane from stains/discoloring caused by adhesives.

B. Mechanically attached TPO membrane:
1. Attach per manufacturers requirements for wind and warranty.

C. Membrane Splicing/Hot Air Welding Procedures:
1. Position adjoining sheets to allow a minimum overlap of 2 in.
2. Hot air weld TPO membrane sheets using the Automatic Hot Air Welding Machine or Hot Air Hand Welder in accordance with the manufacturers hot air welding procedures.
a. At splice intersections, roll the seam with a roller prior to membrane seam cooling.
b. Where 60 mil membrane is specified: Splice intersections shall be overlaid with non-reinforced TPO flashing material (of type recommended by membrane manufacturer).
3. Probe seams once the hot air welds have thoroughly cooled (approximately 30 minutes).
4. Repair seam deficiencies the same day they are discovered.
5. Apply sealant (of type recommended by membrane manufacturer) on cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete.
6. Pull the membrane back along the welded splice so the entire underside of the membrane is exposed once the Hot Air Weld has been completed.
a. Apply bonding adhesive to the exposed underside of the membrane sheet and the substrate.
b. Allow adhesive to dry until tacky and roll the membrane into the substrate and brush down the bonded section with a bristle broom following the procedure noted above.
c. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 in. and complete the bonding procedures as stated previously.
7. Any wrinkles formed in system must be cut out and repaired as recommended by manufacturer.

D. Flashing:
1. Follow manufacturers typical flashing procedures for wall, curb, and penetration flashing including metal edging/coping and roof drain applications.
2. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using reinforced TPO membrane.
3. Manufacturers standard, non-reinforced TPO membrane can be used for flashing pipe penetrations, sealant pockets, scuppers, as well as inside and outside corners when the use of pre-fabricated accessories is not feasible.
4. Terminate base-of-wall flashings in accordance with manufacturers approved details.
5. Pre-flashing at sheet metal parapet copings:
a. Extend TPO membrane and/or flashing over top of parapet prior to capping with sheet metal.
6. Expansion Joints:
a. Extend TPO membrane across roofing expansion joints.

b. Include adequate slack in membrane to accommodate anticipated movement.

3.9 INSTALLATION - EDGE METAL AND COPING

A. Verify that blocking has been installed and adequately secured.

B. Sub-flash details with a layer of TPO membrane prior to installation of edge metal or coping system.

C. Install through-wall coping installation to drainage plane at all parapet to wall intersections.

D. Secure anchor cleat to blocking as recommended, using corrosion-resistant fasteners.

E. Provide continuous TPO strip adhered to anchor cleat fastener penetrations.

F. Install splice plates and snap-on covers.

G. Provide continuous sealant under exterior edge and sealant with 1/2 IN weep areas at 24 IN O.C. under interior edge of cover.

H. Protect finished items from damage for balance of construction period.
1. Repair/replace damaged items.

3.10 DAILY SEAL

A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
1. Complete an acceptable membrane seal in accordance with the manufacturers requirements.

B. Remove temporary water cutoffs prior to proceeding with next work period.
1. Remove and replace wet insulation.

3.11 CLEAN UP

A. All debris must be disposed of in a legally acceptable manner.

B. A representative of manufacturer shall make an inspection and issue written report to Architect that roofing system has been installed properly.

3.12 INSTALLATION - BACKUP MEMBRANE

A. Lay reinforced TPO membrane strip against roof curbs and parapets as indicated on drawings.

B. Membrane to expand 8 IN min. horizontally and vertically. Use bonding adhesive to adhere.

END OF SECTION 075423

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, Shop Drawings, and Samples.

B. Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

C. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METAL

A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003, 3004, 3105, or 5005, temper suitable for forming and structural performance required, but not less than H14; not less than 0.040 inch thick; and with mill finish or finished as follows per drawings:

1. Fluoropolymer Two-Coat System: Manufacturer's standard system with topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604.

B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, with No. 2D finish; not less than 0.016 inch thick.

2.2 FLASHING AND TRIM

A. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

1. Conductor Heads and Downspouts: On plan north elevation, are to be as follows: size, number, and locations to be per NC Code and SMACNA; coordinate locations to avoid interfering with openings; coordinate with crickets in roofing.

2.3 ACCESSORIES

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

C. Butyl Sealant: ASTM C 1311, solvent-release type, for expansion joints with limited movement.

D. Asphalt Mastic: SSPC-Paint 12, asbestos free, solvent type.

E. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

F. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with SMACNA's "Architectural Sheet Metal Manual." Allow for thermal expansion; set true to line and level. Install Work with laps, joints, and seams permanently watertight and weatherproof; conceal fasteners where possible.

1 Roof-Edge Flashings: Secure metal flashings at roof edges according to FMG Loss Prevention Data Sheet 1-49 for specified wind zone.

B. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

C. Fabricate nonmoving seams in sheet metal with flat-lock seams. For aluminum, form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

1 Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches, unless pretinned surface would show in finished Work.

D. Separation: Separate noncompatible metals or corrosive substrates with a coating of asphalt mastic or by other permanent dielectric separation.

END OF SECTION 076200

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, Shop Drawings, and color Samples.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper as recommended by manufacturer for use intended and finish indicated.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper as recommended by manufacturer for use intended and finish indicated.

C. Aluminum Finish: Class I, clear anodic finish; AAC22A41; complying with AAMA 611.

D. Prepainted, Zinc-Coated Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation, structural quality, and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Finish: High-performance organic; three-coat fluoropolymer system with finish coats containing at least 70 percent polyvinylidene fluoride resin by weight.

2.2 ROOF SPECIALTIES

A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Copings: Manufactured coping system consisting of formed-metal coping cap, concealed anchorage, concealed splice plates, mitered corner units, and end-cap units. Fabricate from exposed metal indicated below.

1 Aluminum: 0.050 inch thick.

C. Gravel Stops: Manufactured, one-piece, formed-metal gravel stop, with a horizontal flange and vertical leg fascia terminating in a drip edge, continuous hold-down cleat, and concealed splice plates. Provide mitered and welded or soldered corner units. Fabricate from exposed metal indicated below.

1 Aluminum: 0.050 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate with installation of roof decks and other substrates to produce a watertight assembly capable of withstanding inward and outward loading pressures, and thermal and lateral loads.

B. Coat back side of aluminum roof specialties with bituminous coating where they will contact wood, ferrous metal, or cementitious construction.

C. Expansion Provisions: Install running lengths not exceeding 12 feet to allow controlled expansion for movement of metal components, and to prevent water leakage, deformation, or damage.

END OF SECTION 077100

SECTION 077200 - ROOF ACCESSORIES (TYPE S ROOF HATCH)

PART 1 - GENERAL

1.1 SUMMARY

A Work included: Furnishing and installing factory fabricated roof hatches.

1.2 REFERENCES

A American Society for Testing and Materials (ASTM), 100 Bar Harbor Drive, West Conshocken, PA 19428-2959; (610) 832-9585, fax (610) 832-9555.
1 ASTM A 36-93a: Standard Specification for Structural Steel.

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's product data for all materials in this specification.

B. Shop Drawings: Show profiles, accessories, location, and dimensions.

C. Samples: Manufacturer to provide upon request; sized to represent material adequately.

D. Contract Closeout: Roof hatch manufacturer shall provide the manufacturer's Warranty prior to the contract closeout.

1.4 PRODUCT HANDLING

A. All materials shall be delivered in manufacturer's original packaging.

B. Store materials in a dry, protected, well-vented area. The contractor shall thoroughly inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

C. Remove protective wrapping immediately after installation.

1.5 SUBSTITUTIONS

A. Proposals for substitution products shall be accepted only from bidding contractors and not less than (7) working days before bid due date. Contractor guarantees that proposed substitution shall meet the performance and quality standards of this specification.

1.6 JOB CONDITIONS

A Verify that other trades with related work are complete before installing roof hatch.

B. Mounting surfaces shall be straight and secure; substrates shall be of proper width.

C. Refer to the construction documents, shop drawings, and manufacturer's installation instructions.

D. Coordinate installation with roof membrane and roof insulation manufacturer's instructions before starting.

E. Observe all appropriate OSHA safety guidelines for this work.

1.7 WARRANTY/GUARANTEE

A Manufacturer's standard warranty: Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge. Electrical motors, special finishes, and other special equipment (if applicable) shall be warranted separately by the manufacturers of those products.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-203-934-6363, Fax: 1-203-933-8478, Web: www.bilco.com or approved equal.

2.2 ROOF HATCH

A. Furnish and install where indicated on plans metal roof hatch Type S, size width: 3'0" x length: 2'6". Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.

B. Performance characteristics:

1. Covers shall be reinforced to support a minimum live load of 40 psf with a maximum deflection of 1/150th of the span or 20 psf wind uplift.
2. Operation of the covers shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
3. Operation of the covers shall not be affected by temperature.
4. Entire hatch shall be weathertight with fully welded corner joints on covers and curb.

C. Covers: Shall be 11 gauge aluminum with a 3" beaded flange with formed reinforcing members. Covers shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

D. Cover insulation: Shall be fiberglass of 1" thickness, fully covered and protected by a metal liner 18 gauge aluminum.

E. Curb: Shall be 12” in height and of 11 gauge aluminum. The curb shall be formed with a 3-1/2” flange with 7/16” holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system, including stamped tabs, 6” on center, to be bent inward to hold single ply roofing membrane securely in place.

F. Curb insulation: Shall be rigid, high-density fiberboard of 1” thickness on outside of curb.

G. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe for aluminum construction: welded to the curb assembly.

H. Hardware

1. Heavy pintle hinges shall be provided.
2. Covers shall be equipped with an enclosed two point spring latch with interior and exterior turn handles.
3. Roof hatch shall be equipped with interior and exterior padlock hasps.
4. The latch strike shall be a stamped component bolted to the curb assembly.
5. Covers shall automatically lock in the open position with a rigid hold open arm equipped with a 1” diameter red vinyl grip handle to permit easy release for closing.
6. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed. Springs shall have an electrocoated acrylic finish for corrosion resistance.
7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
8. Provide lock for security.

I. Finishes: Factory finish shall be mill finish aluminum.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify that roof hatch installation will not disrupt other trades. Verify that the substrate is dry, clean, and free of foreign matter. Report and correct defects prior to any installation.

3.2 INSTALLATION

A. Submit product design drawings for review and approval to the architect or specifier before fabrication.

B. The installer shall check as-built conditions and verify the manufacturer’s roof hatch details for accuracy to fit the application prior to fabrication. The installer shall comply with the roof hatch Manufacturer’s installation instructions.

C. The installer shall furnish mechanical fasteners consistent with the roof requirements.

D. Installation: Unless otherwise indicated, install roof accessory items according to construction details of NRCA's "Roofing and Waterproofing Manual." Coordinate with installation of roof deck, vapor barriers, roof insulation, roofing, and flashing to ensure combined elements are secure, waterproof, and weathertight.

END OF SECTION 077200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and color Samples.

B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F (4.4 deg C).

PART 2 - PRODUCTS

2.1 JOINT SEALANTS

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.

B. Sealant for Use in Building Expansion Joints:

1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, M, and O, with the additional capability to withstand 100 percent movement in extension and 50 percent movement in compression for a total of 150 percent movement.

C. Sealant for General Exterior Use Where Another Type Is Not Specified, One of the Following:

1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.
2. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; and Uses NT, M, A, and O.

D. Acoustical Sealant:

1 Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834.

2.2 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer.

B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with ASTM C 1193.

B. Comply with ASTM C 919 for use of joint sealants in acoustical applications.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL FRAMES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Shop Drawings.

B. Comply with ANSI/SDI A250.8.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M, suitable for exposed applications.

B. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M, free of scale, pitting, or surface defects.

C. Galvanized Metallic-Coated Steel Sheet: ASTM A 653/A 653M, with G40 ((Z120) or)A40 (ZF120) metallic coating.

D. Frame Anchors: ASTM A 591/A 591M, 4OZ ((12G)) coating designation; mill phosphatized.

1. For anchors built into exterior walls, sheet steel complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

2.2 HOLLOW METAL FRAMES

A. Products:

B. Doors: Complying with ANSI 250.8 for level and model and ANSI A250.4 for physical endurance level indicated, 1-3/4 inches thick unless otherwise indicated.

1. Exterior Doors: Level 2 and Physical Performance Level B (Heavy Duty), galvanized metallic-coated steel sheet faces.

a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors with thermal-resistance value (R-value) of not less than 4.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.

2. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as door face sheets.

C. Frames: ANSI A250.8; conceal fastenings unless otherwise indicated.

1. Steel Sheet Thickness for Interior Doors: 18 Gauge
2. Steel Sheet Thickness for Exterior Doors: 16 Gauge
3. Fabricate interior frames with mitered or coped and continuously welded corners.
4. Fabricate exterior frames from galvanized metallic-coated steel sheet, with mitered or coped and continuously welded corners.
5. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.
6. Frame Anchors: Not less than 0.042 inch thick.

D. Door Silencers: Three on strike jambs of single-door frames and two on heads of double-door frames.

E Grout Guards: Provide where mortar might obstruct hardware operation.

F. Prepare doors and frames to receive mortised and concealed hardware according to ANSI A250.6 and ANSI A115 Series standards.

G Reinforce doors and frames to receive surface-applied hardware.

H. Prime Finish: Manufacturer's standard, factory-applied coat of lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install hollow metal frames to comply with ANSI/SDI A250.11.

1. Fire-Rated Frames: Install according to NFPA 80.

B. Install doors to provide clearances between doors and frames as indicated in ANSI/SDI A250.11.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying rust-inhibitive primer. Use galvanizing repair paint for metallic coated surfaces.

END OF SECTION 081113

SECTION 081416 - PLASTIC LAMINATE- FACED DOORS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Samples for factory-finished doors.

B. Quality Standard: WDMA I.S.1-A.

C. Fire-Rated Wood Doors: Labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing per NFPA 252 at neutral pressure.

1 At stairs and exit passageways, provide doors that have a temperature rise rating of 450 deg F (250 deg C).

PART 2 - PRODUCTS

2.1 DOOR CONSTRUCTION, GENERAL

A. WDMA I.S.1-A Performance Grade:

1 Heavy Duty unless otherwise indicated.

B. Particleboard-Core Doors: Provide blocking in particleboard cores or provide structural composite lumber cores instead of particleboard cores for doors with exit devices or protection plates.

C. Fire-Protection-Rated Doors: Provide core specified or mineral core as needed to provide fire-protection rating indicated. Provide the following for mineral-core doors:

1. Composite blocking where required to eliminate through-bolting hardware.
2. Laminated-edge construction.
3. Formed-steel edges and astragals for pairs of doors.

2.2 FLUSH WOOD DOORS

A. Plastic Laminate Clad Doors:

1. Interior Solid-Core Doors: Marshfield DoorSystems, Inc. Marshfield Signature Series or Approved Equal.

a. Faces: To be wood-look laminate to match casework vertical surfaces.

23 LIGHT FRAMES

A. Light Frames: Wood beads stained to match doors.

2.4 FABRICATION AND FINISHING

A. Factory fit doors to suit frame-opening sizes indicated and to comply with clearances specified.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3.

C. Cut and trim openings to comply with referenced standards.

1. Trim light openings with moldings indicated.
2. Factory install glazing in doors indicated to be factory finished.
3. Factory install louvers in prepared openings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors to comply with manufacturer's written instructions, WDMA I.S.1-A and as indicated.

1. Install fire-rated doors to comply with NFPA 80.

B. Align and fit doors in frames with uniform clearances and bevels. Machine doors for hardware. Seal cut surfaces after fitting and machining.

C. Clearances: As follows, unless otherwise indicated:

1. 1/8 inch at heads, jambs, and between pairs of doors.
2. 1/8 inch from bottom of door to top of decorative floor finish or covering.
3. 1/4 inch from bottom of door to top of threshold.
4. Comply with NFPA 80 for fire-rated doors.

D. Repair or replace doors damaged during installation, as directed by Architect.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Sheets: ASTM A 1008/A 1008M or ASTM A 591/A 591M.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, with A60 (ZF180) or G60 (Z180) coating.

2.2 ACCESS DOORS AND PANELS

A. Products:

B. Flush Access Doors and Frames with Exposed Trim: Prime-painted steel units.

C. Flush Access Doors and Trimless Frames: Prime-painted steel units with drywall bead flange.

D. Locks: Flush to finished surface, screwdriver operated.

E. Finish as directed by architect.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install access doors and panels accurately in position. Adjust hardware and door and panels for proper operation.

END OF SECTION 083113

SECTION 083213 - AUTOMATIC SLIDING DOORS & DOOR OPERATORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Automatic sliding doors with operator and motion/presence sensor control device.

1.2 RELATED SECTIONS

A. Section 084113 - Aluminum-Framed Storefronts.

B. Section 087100 - Door Hardware.

C. Section 088000 - Glazing.

D. Section 026000 - Electrical.

1.3 REFERENCES

A. ANSI Z97.1 - Safety Glazing Material Used in Buildings.

B. ANSI/BHMA 156.10 - Power Operated Pedestrian Doors.

C. ANSI/UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.

1.4 SYSTEM DESCRIPTION

A. Doors Powered to Open Position:

1. Doors powered by DC electric motor and mechanical gear assembly transmitted to active leaves by fiberglass-reinforced tooth drive belt for silent operation. Doors using roller chain, cable, or hydraulic devices shall not be accepted.
2. Power door to open position by signals received by microprocessor from the actuation controls.
3. The last portion of the opening cycle shall be controlled by a microprocessor generated signal that electronically reduces voltage to motor until door is fully open. Door systems that use microswitches shall not be accepted.
4. To permit safe passage if an obstruction is detected between opening doors and surrounding walls or interior fittings, the doors shall immediately stop and after a delay go to the full closed position. Door systems that only monitor the door travel while closing shall not be acceptable.

B. Doors Powered to Closed Position:

1. The active leafs will only be powered to closed position when all actuating devices are cleared and after remaining in the open position for a preset time delay (per ANSI 156.10-2005 standards).
2. The last portion of the closing cycle shall be controlled by a microprocessor generated signal that electronically reduces voltage to the motor until door is fully closed.
3. To permit safe passage between closing doors, the doors immediately reverse to open position if an obstruction is detected, then resume their interrupted movement at low speed to check whether the obstruction has disappeared or not. Door systems that only monitor the door travel while opening shall not be acceptable.

C. Emergency Breakaway:

1. Full Breakout System: Interior sliding active leaves and sidelites swing out from any position in sliding mode.
2. Breakaway Pressure: Field adjustable to building code requirements and in accordance with ANSI/BHMA 156.10 maximum of 50 pounds.

D. Watchdog Monitoring:

1. Microprocessor Software: Constantly monitor drive train system operations.
2. Watchdog Control Circuit: Assume command of system and shut down automatic function by holding doors open, should door speed, motor function, or drive train operations deviate from design criteria ranges.
3. Secondary Supervisory Circuit: Monitor main Watchdog control circuit every 255 door cycles, ready to perform as a backup. Door systems that do not monitor control circuits every 255 cycles will not be accepted.

E. Energy Saving Device:

1. Switch: Recessed in interior header cover.
2. Door Opening Settings: Off, exit only, 2-way traffic, partial opening, and hold fully open.
3. Partial Opening Mode: Switch reduces total door opening to reduce conditioned air loss.
4. Heavy Weather Pile: Between doors and sidelites and between emergency breakaway hardware and door stiles.

15 PERFORMANCE REQUIREMENTS

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

B. Compliance:

1. ANSI/BHMA 156.10.
2. ANSI/UL 325 listed.

3. Air Infiltration per ASTM E283-91 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across Specimen.
    a. Full breakout: static pressure air infiltration conducted at 0.57 psf (15 mph) with .07 cfm/ft^2 result and 1.57 psf (25 mph) with a 1.3 cfm/ft^2 result.
4. Structural Performance (wind load) per ASTM E330-07 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, Doors by Uniform Static Air Pressure Difference. Testing conducted at positive and negative loads.
    b. Full breakout: 37 psf (120 mph)
5. Forced Entry Resistance per AAMA 1303.5 - Voluntary Specifications for Forced Entry Resistant Aluminum Sliding Glass Doors.

C. Automatic door equipment accommodates medium to heavy pedestrian traffic.

D. Automatic door equipment accommodates up to following weights for active leaf doors:

1. Bi-Part Doors: 220 pounds (100 kg) per active leaf.

E. Operating Temperature Range: -35° F to 122° F (-30° C to 50° C).

F. Motion and Presence Detection System: Uses planar K-band microwave technology to detect motion and focused active infrared technology to detect presence, in a single housing.

G. Systems With Transom Over 16'-0" (4,877 mm) or With Heavy Glass: System can span up to 16 feet without overhead support. Systems at 16'-0", with transoms, or with heavy glass shall install anti-sag rods through transom verticals.

1.6 SUBMITTALS

A. Comply with Section 01330 - Submittal Procedures.

B. Product Data: Submit manufacturer's product data, including description of materials, components, fabrication, finishes, and installation.

C. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections, and details, indicating dimensions, materials, and fabrication of doors, frames, sidelites, operator, motion/presence sensor control device, anchors, hardware, finish, options, and accessories.

D. Samples: Submit manufacturer's samples of aluminum finishes.

E. Test Reports: Submit certified test reports from UL, CUL, and ICBO indicating doors comply with specified performance requirements.

F. Manufacturer's Project References: Submit list of successfully completed projects including project name and location, name of architect, and type and quantity of doors manufactured.

G. Manufacturer's Field Reports: Submit manufacturer's field reports from AAADM certified technician of inspection and approval of doors for compliance with ANSI/BHMA 156.10 after completion of installation.

H. Operation and Maintenance Manual:

1. Submit manufacturer's operation and maintenance manual.
2. Include spare parts list.

I Warranty: Manufacturer's standard warranty shall be one year from date of installation.

J Manufacturer must supply any special tools or devices to make adjustments, setup, and / or to service equipment to the owner with the closeout documents at no additional cost to the owner.

1.7 QUALITY ASSURANCE

A Manufacturer's Qualifications:

1. Continuously engaged in manufacturing of doors of similar type to that specified, with a minimum of 10 years successful experience.
2. Member: American Association of Automatic Door Manufacturers (AAADM).
3. Door, frame, operator, and sensor components from same manufacturer.

B. Installer's Qualifications:

1. Minimum of 2 years successful experience in installation of similar doors.

2. Local certified Besam distributor.

3. Approved by manufacturer. AAADM Certified.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site protected from damage.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials and finish from damage during handling and installation.

1.9 MAINTENANCE SERVICE

A. The manufacturer shall offer a dispatch procedure that shall be available 24 hours per day, 365 days per year to facilitate proper service capability. Provide 2 hour minimum response time to service calls.

B. A manufacturer's designated service contact shall obtain malfunction information and dispatch appropriate service provider to project location.

C. Toll free phone number, 1-877-BESAM-US (1-877-237-2687), shall be prominently displayed on header of each operator.

D. A geographically assigned installation provider shall be trained and certified to provide maintenance service.

PART 2 - PRODUCT

21 MANUFACTURER

A. Besam Entrance Solutions, 1900 Airport Road, Monroe, North Carolina 28110. Toll Free (866) BESAM-US. Phone (704) 290-5520. Fax (704) 290-5555. Web Site www.besam.com. E-Mail marketing@besam-usa.com or approved equal.

22 AUTOMATIC SLIDING DOORS

A Model: Unislide automatic sliding doors. Automatic Sliding Door System: Shall be Besam Unislide System. The system shall consist of sliding aluminum doors, header, operator, threshold track and actuating controls. The Besam header will include the UltraViewTM Motion and Presence Sensor Control System that is self-monitoring and communicates with the Unislide through a monitoring connection. The self-monitoring connection allows the door to go into a failsafe mode in the event of a sensor or monitoring failure. Door systems that do not employ a fail-safe self-monitoring system will not be acceptable.

1. Overhead-concealed, electro-mechanical, microprocessor-controlled, sliding door operator.
2. Operator housing, floor rollers, and door carriers.

B. Sliding Aluminum Doors: Provide door units to dimension heights and widths with corresponding stile glazing as shown on construction documents. Glass stops as specified shall be available for all door panels and transom. The bi-part sliding door system shall include a two-point lock securing the lead edges of the door stiles together and to the hanger assembly. All doors shall have horizontal door extrusions, including optional muntins, with the design characteristic to nest or interlock into the intersecting vertical member. This design feature is to restrict any twisting or movement of the horizontal member that can produce open sightlines and / or compromise the door leaf integrity. The door package shall include security ball catches that latch the swing out panels in the closed position when the sliding doors are in the fully closed position. The active sliding door shall be provided with a key cylinder on the exterior and a thumb turn on the interior in accordance with NFPA 101.

1. Clear Doorway Opening Width: As indicated on the drawings.
2. Overall Frame Width: As indicated on the drawings.
3. Masonry Opening Width: As indicated on the drawings.
4. Active and Sidelite Leaf Width: As indicated on the drawings.
5. Clear Door Opening Height: As indicated on the drawings.
6. Overall Frame Height: As indicated on the drawings.
7. Masonry Opening Height: As indicated on the drawings.
8. Active and Sidelite Leaf Height: As indicated on the drawings.

23 ALUMINUM DOORS AND FRAMES

A. Doors and Frames: Extruded aluminum, Alloy 6063-T5.

1. Hydraulic dampers (optional): provide 90 degree stop and cushion door upon opening and closing during emergency breakout conditions.

B Glass:

1. Glazing Material: ANSI Z97.1.
2. Active Leaves:
   Exterior Automatic Door: 1"-inch glass insulating units. (tempered)
   Interior Automatic Door: 5/8"-inch glass. (tempered)
3. Sidelites:
   Exterior Automatic Door: 1"-inch glass insulating units. (tempered)
4. Preglazed

C Door Operation:

1. Shall be Besam Unislide Door System with UltraViewTM Technology for bi-part or single slide directional operation. In compliance with NFPA 101, all panels shall allow "breakout" to the full open position to provide instant egress at any point in the door's movement. To allow safe egress, automatic operation shall be discontinued when any panels are in the "breakout" mode. Doors and sidelights shall be sized to prevent pinch points at meeting stiles.

D. Aluminum Frame and Extrusions:

1. Shall be a consistent .125" wall thickness throughout the entire extruded member including and not exclusive to, the integral structural sections to maintain the integrity of the overall extruded shape. Glass stops shall have .062-wall thickness. Door systems with less than .125 wall thickness or with .125 "nominal" thicknesses will not be accepted.

E. Sidelites:

1. Provide sidelites to dimension heights and widths as shown on construction documents with corresponding glazing. All sidelights shall have interlocking, nested intermediate rails to prevent twisting and separation. The sidelights shall swing out and allow the sliding doors to "breakout" to the full open position for instant egress at any point in the door's movement per NFPA 101.

F Header Case:

1. Shall be a Besam 7-5/8" x 6-7/8" architecturally enhanced extruded aluminum profile with recessed UltraViewTM sensors on each side to meet ANSI A156.10-05. Header shall be capable of supporting bi-parting doors of 220 pounds per leaf over a span of 16'-" without intermediate supports when using ¼" glass. It shall contain door operator and door mounting components. The header shall be a "closed design" to reduce infiltration of airborne contaminants and debris which may inhibit proper operation and facilitate increased service requirements. Headers with visible underside carrier openings of ¼" or greater, whether in the open or closed positions, shall not be accepted.

G. Roller Composition:

1. Shall consist of two (2) steel roller wheels per door leaf having a 1-3/4" (44mm) diameter with single journal sealed oil-impregnated bearings to ensure roller life on a "replaceable" Delrin track to reduce service cost from normal usage and incorporate self-aligning anti-risers to ensure proper panel positioning. Rollers of any urethane composition shall not be accepted. The assembly shall allow the sliding doors to swing outward and facilitate emergency egress in accordance with NFPA 101.

H. Stiles: Narrow – 2-1/8".

I. Pivots: Top and bottom concealed pivots, extruded aluminum.

J. Hardware: Breakaway.

K. Exterior Glazing Stop Extrusion: Nonremovable, security-type glazing bead to prevent unauthorized entry. Doors utilizing removable exterior stops will not be accepted.

2.4 SLIDING DOOR OPERATION

A. Door Operator and Controller:

1. Shall be a Besam electro-mechanical controlled unit. The operator shall integrate a high-efficiency, energy efficient, DC motor requiring a minimum of 3 A current draw, allowing 5 door systems on one 20 A circuit. The supplied system shall have the capability to operate at full performance well beyond a brown out and high line voltage conditions (85V – 265V) sensing changes and adjusting automatically. The operator shall be of the type to allow an adjustable hold open time delay of 0 to 60 second having internal software to incorporate a self-diagnostic system.

B. Microprocessor Control Box:

1. Besam factory-adjusted configuration, with opening and closing speeds set to comply with ANSI A156.10-2005 requirements. Should the drive train operations deviate from design criteria ranges, Watchdog Control Circuit Monitoring will assume command of the system and shut down the automatic function allowing a secondary supervisory circuit to perform as a backup.

C. Accessories:

1. The Unislide Automatic Sliding Door System shall have the following accessories to reduce energy loss: Adjustable nylon sweep(s) on the bottom of the sliding door(s), double pile weather stripping for the sliding door lead edges, single pile weather stripping between the carrier and the header on the lead stile(s) of the sidelight(s) and the pivot stile(s) of the sliding door(s), and a selector switch located on the interior side of the unit to allow door(s) to open at full or reduced width according to weather and traffic conditions.

25 AIR INFILTRATION

A Weatherstripping: All active door panel weatherstripping shall be concealed, "finned-pile."

2.6 STRUCTURAL PERFORMANCE WIND LOAD COMPLIANCE AND FORCED ENTRY RESISTANCE

A. Interior automatic door locking shall be independent 2 pt- locking system in each active leaf and include exterior key cylinder and interior thumb turn.

B. Exterior automatic door threshold shall be aluminum, 1/2" x 4-1/2" running full width of package with lead-up.

27 MOTION AND PRESENCE SENSOR CONTROL DEVICE

A Motion Sensor: Shall be a Wizard II SMR System: System utilizes dual technology: K-band (24.125GHz) Microwave Motion and Focused Active Infrared technology as follows.

1. System utilizes dual technology: K-band (24.125GHz) Microwave Motion and Focused Active Infrared technology.
2. The microwave portion of the sensor shall be utilized for motion detection for the purpose of door activation, and the infrared portion (comprised of 2 curtains with a total of 48 infrared spots) shall be used for the purpose of presence detection near the door threshold area – the two patterns shall overlap each other.
3. Infrared curtains shall have angle adjustment capability, and shall be capable to reach within 2 inches (51 mm) of the face of the sliding door. The infrared curtains shall not shut off at any door position.
4. Infrared sensor shall provide a 6 feet 6 inches (1.98 m) wide (wide lens) infrared pattern when mounted at 7 feet (2.13 m), and a 3 feet 3 inches (1 m) wide pattern when using the narrow lens.
5. Microwave portion of the sensor shall have bi-directional and uni-directional sensing capability, and shall have a fully adjustable antenna angle. The sensor shall provide a maximum field of motion detection 13 feet (4 m) wide by up to 10 feet (3.05 m) deep.
6. Sensor shall be fully adjustable by remote control.
7. Sensor Dimensions: 14-1/4 inches (108 mm) (362 mm) wide by 1-1/2 inches (38 mm) high by 1-3/8 inches (29 mm) deep.
8. Mounting Height: 7 feet (2.13 m) to 12 feet (3.66 m) above finished floor.
9. Finish: Black ABS housing. May be painted non-metallic only.
10. For 1-Way traffic applications, the sensor that is mounted at the side "not intended for use" shall shut off when the door or doors are within 6 inches (152 mm) of the fully closed position.

B Adjustments:

1. At no additional cost to the owner, manufacturer must furnish with close out documents, any special tools or devises that may be required for setup and / or service to equipment.

2. Adjustments by remote control or manually by push button. LED indications to aid in the positioning of the infrared curtain. Proper LED indication shall signify compliance to applicable ANSI standard for safety pattern.

2.8 ELECTRICAL

A. High-Efficiency DC Motor: Maximum of 3 A current draw. Allow for 5 operators to run on one 20 Amp line.

B. Power: Self-detecting line voltage capable control. 120 V through 240V, 50/60 Hz, 3 A incoming power with solid-earth ground connection for each door system. 5 door systems on one 20 A circuit.

C. Wiring: Separate channel raceway free from moving parts.

D. Brown out/high voltage capability: System has capability to operate at full performance well beyond brown out and high line voltage conditions (85V - 265V) sensing changes and adjusting automatically.

E. Convenience Battery: Shall be concealed in header and capable of full operation with blackout conditions, including sensor capabilities for typically 100 cycles.

2.9 ALUMINUM FINISHES

A. Anodized: Clear, AA-C22A31.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine and measure areas to receive doors. Notify Architect of conditions that would adversely affect installation or subsequent utilization of doors. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Ensure openings to receive frames are plumb, level, square, and in tolerance.

B. Ensure proper support has been provided at operator header.

C. Ensure floor is level and smooth.

3.3 INSTALLTION

A. Install doors in accordance with manufacturer's instructions and ANSI/BHMA 156.10-2005.

B. Install doors and beam plumb, level, square, true to line, and without warp or rack.

C. Anchor frames securely in place.

D. Separate aluminum from other metal surfaces with bituminous coatings or other means approved by Architect.

E. Install exterior doors to be weathertight in closed position.

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

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

3.4 FIELD QUALITY CONTROL

A Manufacturer's Field Services:

1. Manufacturer's representative shall provide technical assistance and guidance for installation of doors.

2. Before placing doors in operation, AAADM certified technician shall inspect and approve doors for compliance with ANSI/BHMA 156.10-2005. Certified technician shall be approved and trained by manufacturer.

3.5 ADJUSTING

A. Adjust doors for proper operation in accordance with manufacturer's instructions and ANSI/BHMA 156.10-2005.

3.6 CLEANING

A. Clean doors promptly after installation in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that would damage glass or finish.

3.7 PROTECTION

A. Protect installed doors and finish to ensure that, except for normal weathering, doors and finish will be without damage or deterioration at time of substantial completion.

PART 4 - AUTOMATIC DOOR OPERATORS

4.1 GENERAL

A. Besam's Access Control Package is used in conjunction with Besam automatic sliding doors. The package can be used with the Unislide overhead concealed package (refer to Section B for specification) or the Unislide (active leaf only) surface mounted package (refer to Section C for specification). Local Besam distributor to perform installation. For the name and number of your contact the factory at (704) 290-5520 or (609) 443-5800.

4.2 RELATED WORK SPECIFIED IN OTHER SECTIONS OF THE SPECIFICATION:

A. Besam's Ingress security activating device (e.g., card reader, key switch, etc.) Remote station ingress switch.

1. Section 087100 - Hardware: for master keyed cylinder (if required).
2. Section 088000 - Glass and Glazing
3. Division 026000 - Electrical - 120V through 240V, 50/60 Hz, 3 A, and low voltage wiring and conduit from slider to remote switching.

4.3 PRODUCTS

A. EQUIPMENT:

1. Access Control Package consists of: 5-position key switch, tamper proof panic exit device, fail secure electronic carriage lock with impulse blocking, motion/presence detector system and optional battery pack. For bi-part packages: carriage lock mechanically secures both active leafs to the door carrier. Systems which employ belt locking mechanisms or single door locking systems or mechanisms are not acceptable. Panic devices: Adams-Rite 8600 panic device surface mounted on active door leaf with an option for exterior key access. Concealed vertical rods are threaded through the leaf edge vertical rails of the active leafs and into the header of the automatic door operator. Door(s) swing out only in direction of egress when panic device is pressed. Panic devices guard against the door(s) being pulled open from the exterior side.

4.4 ACCESS SECURITY PACKAGE OPERATION

A. Access Control Package is a fail secure system. During any power interruption the lock is de-energized and locked, thus securing door(s) in closed position. Means of egress is accomplished by panic exit device. Door closers mounted in operator above each door leaf brings door to a closed and latched position after doors are swung out manually in the panic breakaway position. Should fail safe lock be required, existing fail secure lock can be reprogrammed in the field to accommodate the requirement.

B. Battery pack shall be concealed in header and capable of full operation with blackout conditions, including sensor capabilities for typically 100 cycles.

C. SWITCH "OFF" MODE (maximum security position): doors are locked. All activating devices including security activating devices are disconnected. Means of egress accomplished by panic exit device which meets NFPA Life Safety Code 101, local fire codes and current ANSI/BHMA 156.10 American National Standard for Power Operated Pedestrian Doors.

D. SWITCH "EXIT" MODE (Automatic Egress Position): Doors are locked. Exterior activating devices disconnected. Interior activating devices connected, allowing normal automatic egress after which doors are relocked. Security devices, e.g., card readers, key switches, remote station, etc. are connected allowing controlled ingress.

E. SWITCH "AUTO" MODE (Normal Automatic Position): Doors unlocked. Interior and exterior activating devices connected.

F. SWITCH "ENERGY SAVING CONTROL" MODE: (Normal Automatic Position): Doors unlocked. Interior and exterior activating devices connected. Doors open to a predetermined reduced width for inclement weather, single person access width, etc.

G. SWITCH "OPEN" MODE (Hold Open Position): Doors remain in open position.

H. Provide dead bolt hook by keyed cylinder from sides. For after hours secondary security measures and for exterior sliders.

END OF SECTION 083213

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Structural Performance: Provide systems, including anchorage, capable of withstanding loads indicated.

1. Main-Framing-Member Deflection: Limited to 1/175 of clear span.
2. Structural Testing: Systems tested according to ASTM E 330 at 150 percent of inward and outward wind-load design pressures do not evidence material failures, structural distress, deflection failures, or permanent deformation of main framing members exceeding 0.2 percent of clear span.

B. Air Infiltration: Limited to 0.06 cfm/sq. ft. of system surface area when tested according to ASTM E 283 at a static-air-pressure difference of 6.24 lbf/sq. ft.

C. Water Penetration: Systems do not evidence water leakage when tested according to ASTM E 331 at minimum differential pressure of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

D. Average U-Factor: Not more than 0.69 Btu/sq. ft. x h x deg F per AAMA 1503.

E. Submittals: Product Data, Shop Drawings, and color Samples.

1. For entrance systems, include hardware schedule and locations.

PART 2 - PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONTS

A. Products:

1 Kawneer Company, Inc. or approved equal.

a. 451 Versa Glazed, Thermally Broken, Center Plane, Exterior Glazed System.

B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated; ASTM B 209 (ASTM B 209M) sheet; ASTM B 221 (ASTM B 221M) extrusions.

C. Glazing: Specified in Division 08 Section "Glazing."

D. Sealants and Joint Fillers: For joints at perimeter of systems as specified in Division 07 Section "Joint Sealants."

E. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

F. Fasteners and Accessories: Compatible with adjacent materials, corrosion-resistant, nonstaining, and nonbleeding. Use concealed fasteners except for application of door hardware.

G. Fabrication: Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or, if not indicated, as required for a complete system. Factory assemble components to greatest extent possible. Disassemble components only as necessary for shipment and installation.

H. Aluminum Finish: Comply with NAAMMs "Metal Finishes Manual for Architectural and Metal Products." Clear anodic, Architectural Class I: AA-M12C22A41, complying with AAMA 611, Color anodic, Architectural Class I: AA-M12C22A42/A44, complying with AAMA 611.

1 Color: Clear Anodized Aluminum

PART 3 - EXECUTION

3.1 INSTALLATION

A. Isolate metal surfaces in contact with incompatible materials, including wood, by painting contact surfaces with bituminous coating or primer, or by applying sealant or tape recommended by manufacturer.

B. Install components to provide a weatherproof system.

C. Install framing components true in alignment with established lines and grades to the following tolerances:

1. Variation from Plane: Limit to 1/8 inch in 12 feet; 1/4 inch over total length.
2. Alignment: For surfaces abutting in line, limit offset to 1/16 inch. For surfaces meeting at corners, limit offset to 1/32 inch.
3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

END OF SECTION 084113

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Hardware schedule and keying schedule.

B. Deliver keys to Owner.

C. Fire-Resistance-Rated Assemblies: Provide products that comply with NFPA 80 and are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for applications indicated. On exit devices provide label indicating "Fire Exit Hardware."

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Hinges: (NRP at exterior doors, lab, drug storage and I.T. rooms)
1. McKinney Products Company (Mck)
2. Bommer Industries, Inc. (Bom)
3. Hager Companies (Hag)

B. Continuous Hinges:
1. McKinney Products Company (Mck)
2. Pemko Manufacturing Company (Pem)
3. Zero International (Zer)

C. Latchsets and Locksets:
1. Sargent Manufacturing Company 80 Series (Sar)
2. Corbin Russwin CL3300/ML2000 Series (Cor)
3. Yale Commercial Locks and Hardware 5400LN/8800 Series (Yal)

D. Exit Devices:
1. Sargent Manufacturing Company 80 Series (Sar)
2. Corbin Russwin ED5000 Series (Cor)
3. Yale Commercial Locks and Hardware 7100 Series (Yal)
4. Von Duprin

E. Manual Door Closers:
1. Sargent Manufacturing Company 1431/351 Series (Sar)
2. Norton Door Controls 8501/7500 Series (Nor)
3. Yale Security Group 3501/4400 Series (Yal)
4. Von Duprin

F. Overhead Stops and Holders:
1. Sargent Manufacturing Company (Sar)
2. Architectural Builders Hardware (Abh)
3. Rixson-Firemark (Rix)

G. Manual Bolts:
1. Rockwood Manufacturing Company (Roc)
2. McKinney Products Company (Mck)
3. Trimco (Tri)

H. Protection Plates:
1. Rockwood Manufacturing Company (Roc)
2. McKinney Products Company (Mck)
3. Trimco (Tri)

I. Door Stops:
1. Rockwood Manufacturing Company (Roc)
2. McKinney Products Company (Mck)
3. Trimco (Tri)

J. Thresholds:
1. National Guard Products (Nat)
2. McKinney Products Company (Mck)
3. Zero International (Zer)

K. Gasketing and Door Bottoms:
1. National Guard Products (Nat)
2. McKinney Products Company (Mck)
3. Zero International (Zer)

L. Door Position Switches:
1. Sargent Manufacturing Company (Sar)
2. Sentrol (Sen)
3. Security Door Controls (Sdc)

M. Key Cabinet:
1. Telkee (Tel)
2. Aladin (Ala)
Lund (Lun)

22 HINGES:

1. Stainless-steel hinges with stainless-steel pins for exterior.
2. Nonremovable hinge pins for exterior and public interior exposure.
3. Ball-bearing hinges for doors with closers and entry doors.
4. 3 hinges for 1-3/4-inch- thick doors 90 inches or less in height; 4 hinges for doors more than 90 inches in height.

2.3 LOCKSETS AND LATCHSETS:

1. BHMA A156.2, Series 4000, Grade 1 for bored locks and latches.
2. BHMA A156.3, Grade 1 for exit devices.
3. BHMA A156.5, Grade 1 for auxiliary locks.
4. BHMA A156.12, Series 5000, Grade 1 for interconnected locks and latches.
5. BHMA A156.13, Series 1000, Grade 1 for mortise locks and latches.
6. Lever handles on locksets and latchsets, Jupiter or equal.
7. Provide trim on exit devices matching locksets.

A. Key locks to Owner's new master-key system.

1. Cylinders with six-pin tumblers and removable cores.
2. Provide cylinders for storefront doors, and other locking doors that do not require other hardware.
3. Provide construction keying.
4. Provide key control system, including cabinet.

2.4 CLOSERS:

1. Mount closers on interior side (room side) of door opening. Provide regular-arm, parallel-arm, or top-jamb-mounted closers as necessary.
2. Adjustable delayed opening (accessible to people with disabilities) feature on closers.

A. Provide wall stops or floor stops for doors without closers.

B. Provide hardware finishes as follows:

1. Hinges: Matching finish of lockset/latchset.
2. Locksets, Latchsets, and Exit Devices: Satin chrome plated.
3. Closers: Matching finish of lockset/latchset.
4. Other Hardware: Matching finish of lockset/latchset.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mount hardware in locations recommended by the Door and Hardware Institute unless otherwise indicated.

3.2 HARDWARE SCHEDULE - SEE DRAWINGS

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and 12-inch- square Samples.

B. Fire-Resistance-Rated Assemblies: Provide products that comply with NFPA 80 and are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for applications indicated.

C. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.

1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

E. Insulating-Glass Certification Program: Permanently marked with certification label of Insulating Glass Certification Council and Associated Laboratories, Inc.

PART 2 - PRODUCTS

2.1 GLASS

A. Float Glass: ASTM C 1036, Type I, Class 1 (clear), and Quality Q3.

B. Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated), Type I, Class 1 (clear), Quality Q3, Kind FT (fully tempered).

2.2 FABRICATED GLASS PRODUCTS

A. Sealed Insulating-Glass Units: Vision Solarban 60 low E 1” sealed insulating glass unit with intercept spacer and argon gas fill.

1. Tempered Glass: Interior and exterior lites.

B. Sealed Insulating-Glass Units Spandrel Glass: Factory-assembled units complying with ASTM E 774 for Class CBA units, with two 1/4" thick sheets of glass separated by a 1/2-inch dehydrated space filled with argon.

1. Inboard Lite: 1/4" with Opaci Coat on 4th surface, color as selected by Architect from full range. (tempered)
2. Outboard Lite: 1/4" Clear (tempered)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are contained in GANA's "Glazing Manual."

B. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

C. Remove nonpermanent labels, and clean surfaces immediately after installation.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

C. STC-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing and inspecting agency.

PART 2 - PRODUCTS

2.1 METAL FRAMING AND SUPPORTS

A. Steel Framing Members, General: ASTM C 754.

1. Steel Sheet Components: ASTM C 645. Thickness specified is minimum uncoated base-metal thickness.
2. Protective Coating: manufacturer's standard corrosion-resistant zinc coating.

B. Partition and Soffit Framing:

1. Studs and Runners: In depth indicated and 20 gauge thick unless otherwise indicated.

2.2 ACCESSORIES

A. General: Comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation and with United States Gypsum's "Gypsum Construction Handbook."

1. Gypsum Plaster Assemblies: Also comply with ASTM C 841.
2. Portland Cement Plaster Assemblies: Also comply with ASTM C 1063.
3. Gypsum Veneer Plaster Assemblies: Also comply with ASTM C 844.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Isolate steel framing from building structure, except at floor, to prevent transfer of loading imposed by structural movement.

1 Where studs are installed directly against exterior walls, install asphalt-felt isolation strip between studs and wall.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

C. STC-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing and inspecting agency.

PART 2 - PRODUCTS

2.1 PANEL PRODUCTS

A. Provide in maximum lengths available to minimize end-to-end butt joints.

B. 5/8" type "X" Interior Gypsum Board: ASTM C 36/C 36M or ASTM C 1396/C 1396M, in thickness indicated, with manufacturer's standard edges.

C. 5/8" Mold Resistant Gypsum Board: On inside face of all exterior wall studs.

D. 5/8" mold and water resistant at all interior wet wall locations.

2.2 ACCESSORIES

A. Trim Accessories: ASTM C 1047, formed from galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet. For exterior trim, use accessories formed from hot-dip galvanized-steel sheet, plastic, or rolled zinc.

1. Provide cornerbead at outside corners unless otherwise indicated.
2. Provide LC-bead (J-bead) at exposed panel edges.
3. Provide control joints where indicated.

B. Joint-Treatment Materials: ASTM C 475/C 475M.

1. Joint Tape: Paper unless otherwise recommended by panel manufacturer.
2. Joint Compounds: Drying-type, ready-mixed, all-purpose compounds.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install gypsum board to comply with ASTM C 840.

1. Isolate gypsum board assemblies from abutting structural and masonry work. Provide edge trim and acoustical sealant.
2. Single-Layer Fastening Methods: Fasten gypsum panels to supports with screws.
3. Leave 1/2” gap between GWB and concrete floor (caulk gap with acoustical sealant).

B. Finishing Gypsum Board: ASTM C 840.

1. At concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies, provide Level 1 finish: Embed tape at joints.
2. At substrates for tile, provide Level 2 finish: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges.
3. Unless otherwise indicated, provide Level 4 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.

END OF SECTION 092900

SECTION 093000 - CERAMIC TILE

PART 1) - GENERAL

a) RELATED DOCUMENTS

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

b) SUMMARY

i) This Section includes the following:

(1) Porcelain tile.

ii) Related Sections include the following:

(1) Division 3 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
(2) Division 7 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

c) DEFINITIONS

i) Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

ii) Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).

iii) Facial Dimension: Nominal tile size as defined in ANSI A137.1.

d) PERFORMANCE REQUIREMENTS

i) Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

(1) Level Surfaces: Minimum 0.6.

e) SUBMITTALS

i) Product Data: For each type of tile, mortar, grout, and other products specified.

ii) Shop Drawings: For the following:

(1) Tile patterns and locations.
(2) Widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

iii) Tile Samples for Initial Selection: Manufacturer's color charts consisting of actual tiles or

sections of tiles showing the full range of colors, textures, and patterns available for each type and composition of tile indicated. Include Samples of accessories involving color selection.

iv) Grout Samples for Initial Selection: Manufacturer's color charts of grout showing the full range of colors available for each type of grout indicated.

v) Samples for Verification: Of each item listed below, prepared on Samples of size and construction indicated. Where products involve normal color and texture variations, include Sample sets showing the full range of variations expected.

(1) Each type and composition of tile and for each color and texture required.

vi) Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

f) QUALITY ASSURANCE

i) Installer Qualifications: Engage an experienced installer who has completed tile installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

ii) Source Limitations for Tile: Obtain each color, grade, finish, type, composition, and variety of tile from one source with resources to provide products from the same production run for each contiguous area of consistent quality in appearance and physical properties without delaying the Work.

iii) Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

g) DELIVERY, STORAGE, AND HANDLING

i) Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement of ANSI A137.1 for labeling sealed tile packages.

ii) Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

iii) Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

h) PROJECT CONDITIONS

i) Environmental Limitations: Do not install tile until construction in spaces is completed and ambient temperature and humidity conditions are being maintained to comply with referenced standards and manufacturer's written instructions.

i) EXTRA MATERIALS

i) Deliver extra materials to Owner. Furnish extra materials described below that match products

installed, are packaged with protective covering for storage, and are identified with labels describing contents.

(1) Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2) - PRODUCTS

a) MANUFACTURERS

i) Products: Subject to compliance with requirements, provide products indicated on the drawings.
(1) Tile Products:

(a) American Olean Tile Company.
(b) Crossville Ceramics.
(c) Dal-Tile Corporation.
(d) Florida Tile Industries, Inc.
(e) Mannington Ceramic Tile.
(f) Summitville Tiles, Inc.

(2) Tile-Setting and -Grouting Materials:

(a) American Olean Tile Company.
(b) Atlas Minerals & Chemicals, Inc.
(c) Boiardi Products Corporation.
(d) Bonsal: W.R. Bonsal Company.
(e) Bostik.
(f) Dal-Tile Corporation.
(g) DAP, Inc.
(h) Laticrete International, Inc.
(i) Summitville Tiles, Inc.
(j) TEC Incorporated.

b) PRODUCTS, GENERAL

i) ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

(1) Provide tile complying with Standard Grade requirements, unless otherwise indicated.
(2) For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.

ii) ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting Materials" and "Grouting Materials" articles.

iii) Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

(1) Match colors, textures, and patterns indicated by referencing manufacturer's standard designations for these characteristics.

(2) Provide Architect's selections from manufacturer's full range of colors, textures, and patterns for products of type indicated.
(3) Provide tile trim and accessories that match color and finish of adjoining flat tile.

iv) Factory Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples.

c) TILE PRODUCTS

i) Unglazed Porcelain Tile: Provide flat tile complying with the following requirements:

(1) Composition: Porcelain.
(2) Composition: Impervious natural clay.
(3) Composition: Vitreous natural clay.
(4) Module Size: As indicated on the drawings.
(5) Nominal Thickness: 1/4 inch (6.35 mm).
(6) Face: Pattern of design indicated, with cushion edges.

ii) Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with the following requirements:

(1) Size: As indicated, coordinated with sizes and coursing of adjoining flat tile where applicable.
(2) Shapes: As follows, selected from manufacturer's standard shapes:

(a) Base for Thin-Set Mortar Installations: Straight.
(b) Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
(c) External Corners for Thin-Set Mortar Installations: Surface bullnose.
(d) Internal Corners: Field-butted square corners, except with coved base and cap angle pieces designed to member with stretcher shapes.
(e) Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide a reduction in thickness from 1/2 to 1/4 inch (12.7 to 6.35 mm) across nominal 4-inch (100-mm) dimension.

d) SETTING MATERIALS

i) Latex-Portland Cement Mortar: ANSI A118.4, composed as follows:

(1) Prepackaged Dry-Mortar Mix: Factory-prepared mixture of portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.

(a) For wall applications, provide nonsagging, latex-portland cement mortar complying with ANSI A118.4 for mortar of this type defined in Section F-2.1.2.

(2) Mixture of Dry-Mortar Mix and Latex Additive: Mixture of field mixed dry-mortar mix and liquid-latex additive complying with the following requirements:

(a) Use thin set as follows at all masonry walls at all cement backer and at all floor installations..
(b) Latex Additive: Acrylic resin shall contain minimum of 18% solids.

(c) Materials shall be as specified in ANSI A108.5 and A118.4 except as noted at item a.

e) GROUTING MATERIALS

i) Latex-Portland Cement Grout: ANSI A118.6 for materials described in Section H-2.4, composed as follows:

(1) Mixture of Dry-Grout Mix and Latex Additive: Mixture of field-prepared, dry-grout mix and latex additive complying with the following requirements:

(a) **Walls**: Unsanded Dry-Grout Mix: Dry-set grout complying with ANSI A118.6 for materials described in Section H-2.3, for joints 1/8 inch (3.2 mm) and narrower.
(b) **Floors**: Sanded Dry-Grout Mix: Commercial portland cement grout complying with ANSI A118.6 for materials described in Section H-2.1, for joints 1/8 inch (3.2 mm) and wider.
(c) Latex Additive: Acrylic resin shall contain minimum of 18% solids.

f) ELASTOMERIC SEALANTS

i) General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements of Division 7 Section "Joint Sealants."

ii) Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.

iii) One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes.

iv) Products: Subject to compliance with requirements, provide one of the following:

(1) One-Part, Mildew-Resistant Silicone Sealants:

(a) Dow Corning 786; Dow Corning Corporation.
(b) Sanitary 1700; GE Silicones.
(c) Pecora 898 Sanitary Silicone Sealant; Pecora Corp.
(d) Rhodorsil 6B White; Rhone-Poulenc, Inc.
(e) Tremsil 600 White; Tremco, Inc.

g) MISCELLANEOUS MATERIALS

i) Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

ii) At ceramic tile to carpet, use Corian thresholds 1/4" x 2" with beveled edge.

iii) Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

h) MIXING MORTARS AND GROUT

i) Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

ii) Add materials and additives in accurate proportions.

iii) Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3) - EXECUTION

a) EXAMINATION

i) Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

(1) Verify that substrates for setting tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 series of tile installation standards for installations indicated.
(2) Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
(3) Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust latter in consultation with Architect.

ii) Do not proceed with installation until unsatisfactory conditions have been corrected.

b) PREPARATION

i) Remove coatings, including curing compounds, and other substances that contain soap, wax, oil, or silicone and are incompatible with tile-setting materials by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.

ii) Provide concrete substrates for tile floors installed with dry-set or latex-portland cement mortars that comply with flatness tolerances specified in referenced ANSI A108 series of tile installation standards for installations indicated.

(1) Use trowelable leveling and patching compounds per tile-setting material manufacturer's written instructions to fill cracks, holes, and depressions.
(2) Remove protrusions, bumps, and ridges by sanding or grinding.

iii) Blending: For tile exhibiting color variations within the ranges selected during Sample submittals, verify that tile has been blended in the factory and packaged so tile units taken from one package show the same range in colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

c) INSTALLATION, GENERAL

i) ANSI Tile Installation Standards: Comply with parts of ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated.

ii) TCNA Installation Guidelines: TCNA's "Handbook for Ceramic Tile Installation." Comply with TCNA installation methods indicated.

iii) Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

iv) Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

v) Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are the same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

(1) For tile mounted in sheets, make joints between tile sheets the same width as joints within tile sheets so joints between sheets are not apparent in finished work.

vi) Lay out tile wainscots to next full tile beyond dimensions indicated.

vii) Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

(1) Locate joints in tile surfaces directly above joints in concrete substrates.
(2) Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Sealants."

viii) Grout tile to comply with the requirements of the following tile installation standards:

(1) For ceramic tile grouts, comply with ANSI A108.10 except as noted elsewhere.

d) FLOOR TILE INSTALLATION

i) General: Install tile to comply with requirements in the Ceramic Tile Floor Installation Schedule, including those referencing TCA installation methods and ANSI A108 series of tile installation standards.

(1) At concrete floors - thin set per TCA F102.

ii) Joint Widths: Install tile on floors with the following joint widths:

(1) Porcelain Tile: 1/4 inch (6.35 mm).

iii) Back Buttering: For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:

(1) Tile floors in showers..
(2) Tile floors composed of tiles 8 by 8 inches (203 by 203 mm) or larger.
(3) Tile floors composed of rib-backed tiles.

iv) Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets flooring that finishes flush with tile where tile butts carpet.

e) WALL TILE INSTALLATION

i) Install types of tile designated for wall installations to comply with requirements in the Ceramic Tile Wall Installation, including those referencing TCA installation methods and ANSI setting-bed standards.

ii) At masonry walls and all unheated building use thin set method TCA W202. Over framed walls with backer use organic adhesive TCA W223 or W241 as required.

iii) Joint Widths: Install tile on walls with the following joint widths:

(1) Ceramic Mosaic Tile: 1/16 inch (1.6 mm).
(2) Wall Tile: 1/16 inch (1.6 mm).

iv) Back Buttering: For installations indicated, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:

(1) Tile wall installations in showers.

f) CLEANING AND PROTECTING

i) Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

(1) Remove latex-portland cement grout residue from tile as soon as possible.
(2) Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
(3) Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to brick and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

ii) Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

iii) Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure tile is without damage or deterioration at the time of Substantial Completion.

(1) Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

iv) Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09310

SECTION 095113 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and material Samples.

B. Surface-Burning Characteristics of Panels: ASTM E 1264, Class A materials, tested per ASTM E 84.

C. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS: ACT 1 & ACT 2

A. Products:

1 Armstrong or approved equal.

B. Classification: As follows, per ASTM E 1264:

1 ACT-1, CIRRUS
- a. Color: White
- b. Light Reflectance (LR) Coefficient: Not less than .86
- c. Edge Detail: Angled Tegular
- d. Thickness: 3/4”
- e. Modular Size: 24” x 24” or as indicated on architectural drawings

2. ACT-2, CORTEGA
- a. Color: White
- b. Light Reflectance (LR) Coefficient: Not less than .82
- c. Edge Detail: Angled Tegular
- d. Thickness: 5/8”
- e. Modular Size: 24” x 24” or as indicated on architectural drawings

2.2 CEILING SUSPENSION SYSTEM

A. 15/16” face, direct-hung system; ASTM C 635, heavy-duty structural classification.

1. Products:

a Armstrong: Prelude 15/16”

2. Color: White.

B. Attachment Devices: Sized for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.

C. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

1. Size: Provide yield strength at least 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung), but not less than 0.135-inch diameter wire.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Ceiling Suspension System Installation: Comply with ASTM C 636 and CISCA's "Ceiling Systems Handbook."

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

C. Arrange directionally patterned acoustical panels with pattern parallel to long axis of space

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

B. Extra Materials: Deliver to Owner at least 5%, of each type and color of resilient wall base installed.

PART 2 - PRODUCTS

2.1 WALL BASE (CONTINUOUS ROLL GOODS- 120' ROLLS)

A. Products:

1. SEE DRAWINGS.

B. Color and Pattern: As indicated on drawings.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement- or blended hydraulic cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit products and substrate conditions.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare concrete substrates according to ASTM F 710. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

B. Adhesively install resilient wall base and accessories.

C. Install wall base in maximum lengths possible. Apply to walls, columns, pilasters, casework, and other permanent fixtures in rooms or areas where base is required.

Install reducer strips at edges of floor coverings that would otherwise be exposed.
END OF SECTION 096513

SECTION 096516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

B. Fire-Test Response: Resilient flooring has critical radiant flux classification as indicated per ASTM E 648.

C. Extra Materials: Deliver to Owner at least 5% in roll form and in full roll width, for each type and color of resilient sheet flooring installed.

PART 2 - PRODUCTS

2.1 SHEET VINYL FLOOR COVERING

A. Products:

1. SEE FINISH PLAN DRAWINGS.

B. Color and Pattern: As indicated on drawings.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement- or blended hydraulic cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit sheet vinyl floor covering and substrate conditions indicated.

C. Heat-Welding Bead: Solid-strand product of floor covering manufacturer.

1. Color: Match floor covering.

D. Integral-Flash-Cove-Base Accessories: 1-inch radius cove strip and square metal, vinyl, or rubber cap, both provided or approved by floor covering manufacturer.

1. Provide heat-welded butterflied inside and outside corners per floor covering manufacturer recommendations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare concrete substrates according to ASTM F 710. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

B. Unroll sheet floor coverings and allow them to stabilize before cutting and fitting.

C. Maintain uniformity of resilient sheet flooring direction, and match edges for color shading at seams.

D. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in substrates.

E. Integral Flash Cove Base: Cove floor coverings dimension indicated up vertical surfaces. Support on cove strip and butt against cap strip.

1. Install with butterfly seams at corners.

END OF SECTION 096516

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

B. Extra Materials: Deliver to Owner carpet tiles equal to 5 percent of each type and color carpet tile installed, packaged with protective covering for storage.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Products:

1. SEE FINISH PLAN DRAWINGS.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with CRI 104.

B. Installation Method: As recommended by manufacturer.

C. Install borders parallel to walls.

D. At doorways, center seams under door in closed position. Bind or seal cut edges as recommended by carpet manufacturer.

END OF SECTION 096813

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Summary: Paint exposed surfaces, unless otherwise indicated.

1. Paint the back side of access panels.
2. Do not paint prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.

B. Submittals:

1. Product Data
2. Samples

C. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

D. Mockups: Full-coat finish Sample of each type of coating, color, and substrate, applied where directed.

E. Extra Materials: Deliver to Owner 1 gal. of each color and type of finish coat paint used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

2.1 PAINT

A. Products:

1. Benjamin Moore or approved equal.

B. Material Compatibility: Provide materials that are compatible with one another and with substrates.

1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. Colors: As scheduled.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove hardware, lighting fixtures, and similar items that are not to be painted. Mask items that cannot be removed. Reinstall items in each area after painting is complete.

B. Clean and prepare surfaces in an area before beginning painting in that area. Schedule painting so cleaning operations will not damage newly painted surfaces.

3.2 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use brushes only for exterior painting and where the use of other applicators is not practical.
2. Use rollers for finish coat on interior walls and ceilings.

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply stains and transparent finishes to produce surface films without color irregularity, cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other imperfections. Use multiple coats to produce a smooth surface film of even luster.

3.3 EXTERIOR PAINT APPLICATION SCHEDULE

A. Steel:

1. Semigloss
2. Semigloss, Alkyd Enamel: Two coats over rust-inhibitive primer: MPI EXT 5.1D.

B. Galvanized Metal:

1. Semigloss, Alkyd Enamel: Two coats over cementitious galvanized-metal primer: MPI EXT 5.3B.

C. Aluminum:

1. Semigloss, Alkyd Enamel: Two coats over quick-drying primer for aluminum: MPI EXT 5.4F.

D. Exterior Gypsum Soffit Board:

1. Flat Latex: Three coats: MPI EXT 9.2A.

3.4 INTERIOR PAINT APPLICATION SCHEDULE

A. Concrete:

1. Clear Concrete Sealer.

B. Steel:

1. Semigloss, Quick-Dry Enamel: Two coats over quick-drying alkyd metal primer: MPI INT 5.1A.
2. Flat, Alkyd Enamel: Two coats over quick-drying alkyd primer: MPI INT 5.1E.

C. Galvanized Metal:

1. Semigloss, Alkyd Enamel: Two coats over cementitious galvanized-metal primer: MPI INT 5.3C.

D. Gypsum Board:

Latex: Two coats over primer/sealer: MPI INT 9.2A.

END OF SECTION 099100

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall guards.
2. Impact-resistant handrails.
3. Impact-resistant wall coverings.
4. Corner guards.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide handrails capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
2. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
3. Uniform and concentrated loads need not be assumed to act concurrently.

1.3 SUBMITTALS

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

B. Shop Drawings: For each impact-resistant wall protection unit. Include sections, details, and attachments to other work.

C. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long.

D. Maintenance data.

E. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Surface-Burning Characteristics: As determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.

C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures.
b. Deterioration of plastic and other materials beyond normal use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 HANDRAILS

A. Impact-Resistant Plastic Handrails: Assembly consisting of snap-on plastic cover installed over continuous retainer.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. American Floor Products Co., Inc.
b. Arden Architectural Specialties, Inc.
c. Balco, Inc.
d. Construction Specialties, Inc.
e. IPC Door and Wall Protection Systems; Division of InPro Corporation.
f. Korogard Wall Protection Systems; a division of RJF International Corporation.
g. Pawling Corporation.
h. WallGuard.com.

2. Cover: Minimum 0.078-inch- (2.0-mm-) thick, extruded rigid plastic; in dimensions and profiles indicated on Drawings.

a. Single Handrail: Cylindrical tube profile cover with continuous retainer; with mounting brackets supporting bottom of rail.

3. Retainer: Minimum 0.080-inch- (2.0-mm-) thick, one-piece, extruded aluminum.
4. Accessories: Concealed splices, cushions, and mounting hardware.

2.2 IMPACT-RESISTANT WALL COVERINGS

A. Impact-Resistant Sheet Wall Covering : Fabricated from plastic sheet wall-covering material.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. American Floor Products Co., Inc.
b. Arden Architectural Specialties, Inc.
c. Balco, Inc.
d. Construction Specialties, Inc.
e. IPC Door and Wall Protection Systems; Division of InPro Corporation.

f. Korogard Wall Protection Systems; a division of RJF International Corporation.
g. Tepromark International, Inc.

2. Size: As indicated.
3. Sheet Thickness: 0.080 inch (2.0 mm).
4. Trim and Joint Moldings: Extruded rigid plastic that matches sheet wall covering color.
5. Mounting: Adhesive.

2.3 CORNER GUARDS

A. Surface-Mounted, Opaque-Plastic Corner Guards: Fabricated from PVC plastic, acrylic-modified vinyl sheet or opaque polycarbonate sheet; with formed edges; fabricated with 90- or 135-degree turn to match wall condition; in dimensions and profiles indicated on Drawings.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. American Floor Products Co., Inc.
b. Arden Architectural Specialties, Inc.
c. Balco, Inc.
d. Construction Specialties, Inc.
e. IPC Door and Wall Protection Systems; Division of InPro Corporation.
f. Korogard Wall Protection Systems; a division of RJF International Corporation.
g. Musson Rubber Company.
h. Pawling Corporation.
i. Tepromark International, Inc.

2. Mounting: Adhesive.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Install impact-resistant wall protection units in locations and at mounting heights indicated on Drawings.
2. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.

a. Provide anchoring devices to withstand imposed loads.
b. Where splices occur in horizontal runs of more than 20 feet (6.1 m), splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches (305 mm).

B. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.

C. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

SECTION 102800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MATERIALS

A. As scheduled on architectural drawings.

B. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

C. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

2.2 TOILET AND BATH ACCESSORIES

A. Manufacturers:

1 As scheduled on architectural drawings.

B. Underlavatory Guard: (Truebro Lav Guard 2 undersink piping covers or approved equal)

1. Description: Insulating pipe coverings for supply and drain piping assemblies, which prevent direct contact with and burns from piping, and allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Install grab bars to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

B. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

END OF SECTION 102800

SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Fire-Rated, Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

PART 2 - PRODUCTS

2.1 FIRE-PROTECTION CABINETS

A. Fire-Protection Cabinets: Enameled-steel, cabinets for fire extinguisher.

1. Products:

a. SEE ARCHITECTURAL DRAWINGS.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cabinets at 54 inches above finished floor to top of cabinet or as indicated by the manufacturer to meet ADA ICC/ANSI A117.1 - 2003 guidelines or heights acceptable to authorities having jurisdiction.

B. Fire-Rated Hose or Valve Cabinets: Seal through penetrations with firestopping sealant.

END OF SECTION 104413

SECTION 122113 - MECHO SHADES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

B. Provide blinds passing flame-resistance testing according to NFPA 701.

C. Product Standard: Unless otherwise indicated, comply with WCMA A 100.1.

PART 2 - PRODUCTS

2.1 MECHO SHADES

A. Products: SEE DWGS FOR MORE INFORMATION

B. Mounting: Headrail, vertical surface of storefront head, so blinds are flush with face of storefront frame.

C. Colors, Textures, Patterns, and Gloss: To be selected from manufacturer's full range.

D. Openness factor of shade shall be decided by VA representative or COTR based on building location and site.

E. Fabrication: Comply with AWCMA Document 1029 unless otherwise indicated.

1. Fabricate concealed components from noncorrodible or corrosion-resistant-coated materials.
2. Provide lifting and tilting mechanisms with permanently lubricated moving parts.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install shades level, plumb, and located not closer than 1 inch to interior face of glass.

END OF SECTION 122113

SECTION 312011 - EARTH MOVING FOR BUILDINGS

PART 1 - GENERAL

1.1 DESCRIPTION:

This section specifies the requirements for furnishing all equipment, materials, labor and techniques for earthwork including excavation, fill, backfill and site restoration utilizing fertilizer, seed and/or sod.

1.2 DEFINITIONS:

A. Unsuitable Materials:

1. Fills: Topsoil, frozen materials; construction materials and materials subject to decomposition; clods of clay and stones larger than 75 mm (3 inches); organic materials, including silts, which are unstable; and inorganic materials, including silts, too wet to be stable.
2. Existing Subgrade (except footings): Same materials as above paragraph, that are not capable of direct support of slabs, pavement, and similar items, with the possible exception of improvement by compaction, proofrolling, or similar methods of improvement.
3. Existing Subgrade (footings only): Same as Paragraph 1, but no fill or backfill. If materials differ from reference borings and design requirements, excavate to acceptable strata subject to Resident Engineer's approval.

B. Earthwork: Earthwork operations required within the new construction area. It also includes earthwork required for auxiliary structures and buildings and sewer and other trenchwork throughout the job site.

C. Degree of Compaction: Degree of compaction is expressed as a percentage of maximum density obtained by the test procedure presented in ASTM D698.

D. The term fill means fill or backfill as appropriate.

1.3 RELATED WORK:

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

1.4 CLASSIFICATION OF EXCAVATION:

A. Classified Excavation: Removal and disposal of all material not defined as rock.

B. Rock Excavation:

1. Solid ledge rock (igneous, metamorphic, and sedimentary rock).
2. Bedded or conglomerate deposits so cemented as to present characteristics of solid rock which cannot be excavated without blasting; or the use of a modern power excavator (shovel,

backhoe, or similar power excavators) of no less than 0.75 m3 (1 cubic yard) capacity, properly used, having adequate power and in good running condition.

3. Boulders or other detached stones each having a volume of 0.4 m3 (1/2 cubic yard) or more.

1.5 MEASUREMENT AND PAYMENT FOR ROCK EXCAVATION:

A. Measurement: Cross section and measure the uncovered and separated materials, and compute quantities by the Registered Professional Land Surveyor or Registered Civil Engineer, specified in Section 01 00 00, GENERAL REQUIREMENTS. Do not measure quantities beyond the following limits:

1. 300 mm (12 inches) outside of the perimeter of formed footings.
2. 600 mm (24 inches) outside the face of concrete work for which forms are required, except for footings.
3. 150 mm (6 inches) below the bottom of pipe and not more than the pipe diameter plus 600 mm (24 inches) in width for pipe trenches.
4. The outside dimensions of concrete work for which no forms are required (trenches, conduits, and similar items not requiring forms).

B. Payment: No separate payment shall be made for rock excavation quantities shown. The contract price and time will be adjusted for overruns or underruns in accordance with Articles, DIFFERING SITE CONDITIONS, CHANGES and CHANGES-SUPPLEMENT of the GENERAL CONDITIONS as applicable.

1.6 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Rock Excavation Report:

1. Certification of rock quantities excavated.
2. Excavation method.
3. Labor.
4. Equipment.
5. Land Surveyor's or Civil Engineer's name and official registration stamp.
6. Plot plan showing elevations.

1.7 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. American Nursery and Landscape Association (ANLA): 2004
.....American Standard for Nursery Stock

C. American Association of State Highway and Transportation Officials (AASHTO):
T99-01(R2004).....Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 inch) Drop

T180-01 (2004) ..... Moisture-Density Relations of Soils Using a 4.54-kg [10 lb] Rammer and a 457 mm (18 inch) Drop

D. American Society for Testing and Materials (ASTM): D698-07..Laboratory Compaction Characteristics of Soil Using Standard Effort
D1557-02.....Laboratory Compaction Characteristics of Soil Using Modified Effort

E. Standard Specifications of (Insert name of local state) State Department of Transportation, latest revision.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Fills: Materials approved from on site and off site sources having a minimum dry density of 1760 kg/m3 (110 pcf), a maximum Plasticity Index of 6, and a maximum Liquid Limit of 30.

B. Granular Fill:

1. Under concrete slab, crushed stone or gravel graded from 25 mm (1 inch) to 4.75 mm (No. 4).

PART 3 EXECUTION

3.1 SITE PREPARATION:

A. Clearing: Clearing within the limits of earthwork operations as described or designated by the Resident Engineer. Work includes removal of trees, shrubs, fences, foundations, incidental structures, paving, debris, trash and any other obstructions.

B. Stripping Topsoil: Unless otherwise indicated on the drawings, the limits of earthwork operations shall extend anywhere the existing grade is filled or cut or where construction operations have compacted or otherwise disturbed the existing grade or turf. Strip topsoil as defined herein, or as indicated in the geotechnical report, from within the limits of earthwork operations as specified above unless specifically indicated or specified elsewhere in the specifications or shown on the drawings. Topsoil shall be fertile, friable, natural topsoil of loamy character and characteristic of the locality. Topsoil shall be capable of growing healthy horticultural crops of grasses. Stockpile topsoil and protect as directed by the Resident Engineer. Eliminate foreign material, such as weeds, roots, stones, subsoil, frozen clods, and similar foreign materials, larger than 0.014 m3 (1/2 cubic foot) in volume, from soil as it is stockpiled. Retain topsoil on the station. Remove foreign materials larger than 50 mm (2 inches) in any dimension from topsoil used in final grading. Topsoil work, such as stripping, stockpiling, and similar topsoil work, shall not, under any circumstances, be carried out when the soil is wet so that the tilth of the soil will be destroyed.

3.2 EXCAVATION:

A. Building Earthwork:

1. Excavation shall be accomplished as required by drawings and specifications.
2. Excavate foundation excavations to solid undisturbed subgrade.
3. Remove loose or soft material to solid bottom.
4. Fill excess cut under footings or foundations with 25 MPa (3000 psi) concrete, poured separately from the footings.
5. Do not tamp earth for backfilling in footing bottoms, except as specified.

3.3 FILLING AND BACKFILLING:

A. General: Do not fill or backfill until all debris, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from the excavation. Proof-roll exposed subgrades with a fully loaded dump truck. Use excavated materials or borrow for fill and backfill, as applicable. Do not use unsuitable excavated materials. Do not backfill until foundation walls have been completed above grade and adequately braced, waterproofing or dampproofing applied, and pipes coming in contact with backfill have been installed, and inspected and approved by Resident Engineer.

B. Proof-rolling Existing Subgrade: Proof-roll with a fully loaded dump truck. Make a minimum of one pass in each direction. Remove unstable uncompactable material and replace with granular fill material completed to mix requirements specified.

C. Placing: Place material in horizontal layers not exceeding 200 mm (8 inches) in loose depth and then compacted. Do not place material on surfaces that are muddy, frozen, or contain frost.

D. Compaction: Use approved equipment (hand or mechanical) well suited to the type of material being compacted. Do not operate mechanized vibratory compaction equipment within 3000 mm (10 feet) of new or existing building walls without the prior approval of the Resident Engineer. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Compact each layer to not less than 95 percent of the maximum density determined in accordance with the following test method ASTM D698.

END OF SECTION 312011

SECTION 313116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and product certificates for each type of product indicated. Include the EPA-Registered Label.

B. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

C. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

PART 2 - PRODUCTS

2.1 TERMITE CONTROL PRODUCTS

A. Soil Treatment Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

B. Soil Treatment Application: Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.

1. At foundations.
2. Under concrete floor slabs on grade.
3. At hollow masonry.
4. At expansion and control joints and slab penetrations.

C. Post warning signs in areas of soil treatment application.

END OF SECTION 313116