

DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS

Section 00010	Table of Contents.....	3
Section 00020	Bid Package Documents / Drawing List.....	1
Section 00030	Project Directory.....	1
Section 00100	Invitation to Bid.....	3
Section 00200	Scope of Work.....	Under Separate Cover by Bid Package
Section 00300	Proposal Form.....	5
Section 00400	Wesleyan University Master Purchase Agreement Products/Services	7
Section 00500	AIA Document A101 – 1997 – Standard Form of Agreement between Owner and Contractor	6
Section 00700	AIA Document A201 – 1997 – General Conditions of the Contract for Construction	40
Section 00800	Supplementary Conditions	60

DIVISION 1 – GENERAL REQUIREMENTS

Section 01015	General Project Requirements	17
Section 01030	Alternates.....	2
Section 01040	Coordination	7
Section 01045	Cutting and Patching.....	4
Section 01200	Project Meetings	3
Section 01301	Submittals	12
Section 01380	Construction Photographs.....	2
Section 01400	Quality Control	3
Section 01421	Reference Standards	4
Section 01500	Construction Facilities	7
Section 01505	Construction Waste Management.....	10
Section 01600	Materials and Equipment.....	3
Section 01631	Product Substitutions	4
Section 01700	Project Closeout.....	4
Section 01732	Selective Demolition.....	2
Section 01740	Warranty	3

SAREN ENGINEERING, INC.

Technical Specifications	Pages 1 thru 38
--------------------------------	-----------------

DIVISION 2 – SITE WORK

Section 02230	Site Clearing	4
Section 02300	Earthwork	3
Section 02333	Trenching and Backfilling	7
Section 02510	Water Distribution	3
Section 02621	PVC Pipe	3
Section 02740	Pavement Subbase	4
Section 02741	Asphalt Paving.....	4
Section 02815	Precast Channel Drainage System	2
Section 02920	Lawn and Grasses	2

DIVISION 3 – CONCRETE

Section 03300	Cast In Place Concrete	13
---------------	------------------------------	----

DIVISION 5 – METALS

Section 05500	Metal Fabrication	3
---------------	-------------------------	---

DIVISION 6 – WOOD AND PLASTICS

Section 06100	Rough Carpentry	4
Section 06200	Finish Carpentry	3
Section 06402	Interior Architectural Wood work	3
Section 06900	Wood Restoration	5

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

Section 07210	Building insulation.....	2
Section 07311	Asphalt Shingles	3
Section 07460	Siding	5
Section 07531	EPDM Membrane Roofing	6
Section 07710	Manufactured Roof Specialties	3
Section 07841	Through- Penetration Fire Stop Systems	3
Section 07920	Joint Sealants	3

DIVISION 8 DOORS AND WINDOWS

Section 08110	Steel Doors and Frames	3
Section 08212	Stile and Rail Wood Doors	2
Section 08311	Access Doors and Frames	1
Section 08541	Fiberglass Windows.....	6
Section 08550	Wood Windows	3
Section 08561	Vinyl Windows	3
Section 08585	Slimline Security Screens	2
Section 08710	Door Hardware-Academic/Administrative Buildings	5
Section 08710w	Door Hardware-Student Housing	5
Section 08720	Weatherstripping and Seals	2
Section 08800	Glazing.....	3

DIVISION 9 – FINISHES

Section 09260	Gypsum Board Assemblies.....	3
Section 09290	Fiberglass Columns.....	3
Section 09641	Laminate Flooring.....	2
Section 09642	Wood Floor Refinishing	3
Section 09651	Resilient Floor Tile	3
Section 09652	Sheet Vinyl Floor Coverings	3
Section 09653	Resilient Wall Base and Accessories	3
Section 09680	Carpet.....	3
Section 09681	Carpet Cleaning	1
Section 09770	Special Wall Surfaces	2
Section 09910	Painting	6

DIVISION 10 – SPECIALTIES

Section 10801 Toilet Accessories..... 3

DIVISION 11 – EQUIPMENT

Section 11451 Residential Appliances.....3

DIVISION 12 – FURNISHINGS

Section 12356 Residential Casework.....2
 Section 12500 Window Treatment2

DIVISION 13 – SPECIAL CONSTRUCTION

Section 13080 Sound Control Access Systems Noise-Lock Doors5

DIVISION 15 – MECHANICAL

Section 15050 Basic Mechanical Materials and Methods 5
 Section 15325 Fire Sprinkler Systems..... 11
 Section 15410 Plumbing Fixtures 5
 Section 15830 Fans 2
 Section 15900 Instrumentation and Controls..... 1

DIVISION 16 - ELECTRICAL

Section 16050 Basic Electrical Materials and Methods 6
 Section 16140 Wiring Devices 2
 Section 16500 Lighting – SUBJECT TO CHANGE..... 3
 Section 16722 Woodframes - Intelligent Reporting Fire Detection System 16

EXHIBITS

Exhibit ‘A’ Wesleyan University - Product & Service Procurement Master Terms & Conditions / Vendor & Contractor Insurance Requirements 7
 Exhibit ‘B’ Wesleyan University Community Participation Program..... 2
 Exhibit ‘C’ Contractor’s Consent and Agreement..... 5
 Exhibit ‘D’ Equal Employment Opportunity Certification..... 6
 Exhibit ‘E’ Smoking Policy..... 1
 Exhibit ‘F’ Green Policy 4
 Exhibit ‘G’ Sidewalk Vehicle Access Pass..... 1

ATTACHMENTS

Attachment ‘1’ (Sub)Contractor Information Sheet..... 1
 Attachment ‘2’ Hot Work Permit..... 1
 Attachment ‘3’ Confined Space 2
 A-1 Typical Landing, Stair & Porch Replacement Details..... 1

SECTION 02230 SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Protecting existing trees, shrubs, groundcovers, plants, and grass to remain.
 - 2. Removing existing trees, shrubs, groundcovers, plants, and grass.
 - 3. Clearing and grubbing, including selective clearing in designated areas.
 - 4. Stripping and stockpiling topsoil.
 - 5. Removing above- and below-grade site improvements.
 - 6. Disconnecting, capping or sealing, abandoning site utilities in place, and removing site utilities.

1.2 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.
- C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots.

1.3 MATERIAL OWNERSHIP

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

1.4 SUBMITTALS

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

1.5 QUALITY ASSURANCE

- A. Stake limits of clearing, grubbing, and stripping, prior to commencing of work.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction. Detour routes shall be identified by adequate signs in accordance with the MUTCD.
- B. Protect areas outside limits of disturbance from encroachment by construction personnel or equipment, regardless of property Ownership. Access shall be by specific, written permission or easement only
- C. Salvageable Improvements: Carefully remove items indicated to be salvaged and deliver to storage location defined on the plans or specified here in.
- D. Utility Locator Service: Properly notify utility locator service for area where Project is located before site clearing in accordance with local protocol.
- E. Do not commence site clearing operations until temporary erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Cut branches and roots, if required, with sharp pruning instruments; do not break or chop.
- B. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree drip line before starting site clearing. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated material within fenced area.
 - 2. Do not permit vehicles, equipment, or foot traffic within fenced area.
 - 3. Maintain fenced area free of weeds and trash.
- B. Do not machine excavate within tree drip line.

- C. Where excavation for new construction is required within tree drip line, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
- D. Do not allow exposed roots to dry out before permanent backfill is placed; provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with earth.
 - 1. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 - 2. Coat cut faces of roots more than 1-1/2 inches (38 mm) in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
 - 3. Backfill with soil as soon as possible.
 - 4. Where trenching for utilities is required within drip line, tunnel under or around roots by hand digging. Do not cut main lateral roots or tap roots; cut only smaller roots that interfere with installation of new work. Cut roots with sharp pruning instruments; do not break or chop.
- E. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by the owner

3.3 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner's Representative and owner not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's Representative written permission.

3.4 CLEARING AND GRUBBING

- A. Completely remove obstructions, trees, shrubs, stumps, roots, grass, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Use only hand methods for grubbing within tree protection zone.

3. Chip removed tree branches and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations in accordance with Section "Earthwork," unless further excavation or earthwork is indicated.
 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

- A. Remove all roots/stumps before stripping topsoil.
- B. Where trees are designated to remain, stop topsoil stripping and adequate distance from the trees to prevent damage to the main root system.
- C. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
- D. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust. Haul all excess topsoil not required for reuse to the on campus 'Potato Field'. Neatly stockpile as directed by the Owner.
 1. Limit height of topsoil stockpiles to 72 inches (1800 mm).
 2. Do not stockpile topsoil within tree protection zones.

3.6 SITE IMPROVEMENTS

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

3.7 DISPOSAL

- A. Burning of debris onsite is not permitted.
- B. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Related Work Specified Elsewhere:
 - 1. Division 1 – General Requirements is made a part of this section.
 - 2. Section 02920 – Lawns and Grasses is made a part of this section.
 - 3. Division 5 – Metals is made a part of this section.

1.2 SECTION REQUIREMENTS

- A. For all soils removed from the site, soil classification testing must be performed by an independent testing facility.
- B. Unit prices for rock excavation shall be provided by the contractor.
- C. Unauthorized excavation consists of excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner. Unauthorized excavation, as well as remedial work directed by Owner, shall be without additional compensation.
- D. Do not interrupt existing utilities serving facilities occupied by Owner or others unless permitted in writing by Owner and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil: ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM; free of rock or gravel larger than 2 inches (50 mm) in any dimension, debris, waste, frozen materials, vegetation, or other deleterious matter.
- B. Unsatisfactory Soil: ASTM D2487 Soil Classification Groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
- C. Backfill and Fill: Satisfactory soil materials.
- D. Subbase Material: Unless otherwise noted on the contract drawings, naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; with at least 90 percent passing a 1-1/2-inch (37.5-mm) sieve and not more than 12 percent passing a No. 200 (0.075-mm) sieve.
- E. Bedding Course: Unless otherwise noted on the contract drawings, naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand;

ASTM D2940; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

- F. Drainage Course: Unless otherwise noted on the contract drawings, narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Protect and maintain erosion and sedimentation controls during earthwork operations.
- B. Protect subgrades and foundation soils from softening and damage by water, freezing temperatures, or frost.
- C. Explosives: Do not use explosives.
- D. Excavate to subgrade elevations regardless of character of materials and obstructions encountered.
- E. Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Owner. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents.
- F. Excavate for pavements, and walkways. Trim subgrades to required lines and grades.
- G. Utility Trenches: Excavate trenches to indicated slopes, lines, depths, and invert elevations. Maintain 12 inches (300 mm) of working clearance on each side of pipe or conduit.
 - 1. Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.
 - 2. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. Plow strip or break up sloped surfaces steeper than 1 vertical to 4 horizontal to receive fill.
- I. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface, pulverize, moisture-condition or aerate soil, and recompact.
- J. Place backfill and fill in layers not more than 8 inches (200 mm) in loose depth at optimum moisture content. Compact each layer under structures, building slabs, pavements, and walkways to 95percent of maximum dry unit weight according to ASTM D 698; elsewhere to 90 percent.

WESLEYAN UNIVERSITY

- K. Grade areas to a smooth surface to cross sections, lines, and elevations indicated. Grade lawns, walkways, and unpaved subgrades to tolerances of plus or minus 1 inch (25 mm) and pavements and areas within building lines to plus or minus 1/2 inch (13 mm).
- L. Under pavements and walkways, place subbase course material on prepared subgrades and compact at optimum moisture content to required grades, lines, cross sections, and thicknesses.
- M. Under slabs-on-grade, place drainage course on prepared subgrade and compact to required cross section and thickness.
- N. Allow testing agency to inspect and test each subgrade and each fill or backfill layer and verify compliance with requirements.
- O. Consult with Owner prior to removing any surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris. Legally dispose of it off Owner's property. Disposal procedures shall be in accordance with Wesleyan University Environmental Health and Safety requirements.

END OF SECTION 02300

SECTION 02333 TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the excavation of trenching, backfilling, compacting, excavation support and disposal, as shown on the Contract Drawings, and as herein specified.
- B. The Engineer will determine the suitability of materials that are to be used in the work and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

- A. Reference Standards:
 - 1. The latest edition of the following standards, as referenced herein, shall be applicable.
 - a. "State of Connecticut Department of Transportation Standard Specifications."
 - b. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."
 - c. American Society for Testing and Materials (ASTM).
 - d. National Electric Code(NEC)
- B. The Contractor shall comply with the requirements for soil erosion and sedimentation control and other requirements of governmental authorities having jurisdiction, including the State.
- C. Field Testing and Inspection Services: Owner shall retain the services of an independent soil testing laboratory to provide soil testing during construction.

1.3 SUBMITTALS

- A. Samples:
 - 1. The Contractor shall furnish representative earth materials to the testing laboratory for analysis and report, as directed by the Engineer, or as outlined in the specifications.
- B. Test Results:
 - 1. The testing laboratory shall submit written reports of all tests, investigations, findings and recommendations to the Contractor and the Engineer.

1.4 PROJECT REQUIREMENTS

- A. Notify the Engineer of any unexpected subsurface condition.
- B. Protect excavations by shoring, bracing, sheet piling, or by other methods, as required to ensure the stability of the excavation. Comply with OSHA requirements.
- C. Underpin or otherwise support structures adjacent to the excavation which may be damaged by the excavation. This includes service lines.
- D. Protection of Existing Utilities:
 - 1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations. Comply with OSHA requirements.
 - 2. Coordinate interruption and/or termination of utilities with the utility companies and the Owner.
 - 3. Provide a minimum of forty-eight (48) hours notice to the Owner and receive written notice to proceed before interrupting any utility.
- E. Repair any damaged utilities as acceptable to the Owner, Engineer, and utility company at no additional cost to the Owner.
- F. Contractor shall comply with maintenance and protection requirements as approved by the authority having jurisdiction.
- G. Protection of Persons and Property:
 - 1. Barricade open excavations occurring as part of this work and post with warning lights, if required.
 - 2. Operate warning lights as recommended by authorities having jurisdiction.
 - 3. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
 - 4. Perform excavation within drip-line of trees to remain by hand, and protect the root system from damage or dryout to the greatest extent possible. Maintain moist conditions for root system and cover exposed roots with burlap. Paint cut roots of 1" diameter and larger with emulsified asphalt tree paint.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pipe Zone Bedding: Select mixture of graded crushed stone, free from organic, frozen or other deleterious materials, and meeting the following gradation requirements:

WESLEYAN UNIVERSITY

Sieve	Percent Passing
1"	100
3/4"	90 - 100
1/2"	10 - 50
3/8"	0 - 20
No. 4	0 - 5

- B. Pipe Zone Backfill: Sound, durable sand, gravel, stone or blends of these materials, free from organic, frozen or other deleterious materials, and meeting the following gradation requirements:

Sieve	Percent Passing
2"	100
1/4"	30 - 65
No. 40	5 - 40
No. 200	0 - 10

- C. Suitable Material: Sound, durable sand, gravel, stone or blends of these materials, free from organic, frozen or other deleterious materials, conforming to the requirements of CONNDOT Article M.02.06 Grading B (See Section 312000, 2.1 B "Selected Fill").

Run-of-trench material, meeting the above criteria, shall be considered suitable material and shall be used for trench backfill only after tested in accordance with Section "Quality Requirements" and approved by the Engineer. The Contractor shall pay for all additional testing required to determine the conformance of run-of-trench material, if at any time during the Work this material appears to be in non-conformance in the opinion of the Engineer.

PART 3 - EXECUTION

3.1 PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

- A. Owner shall employ and pay for a qualified independent soil testing laboratory to perform soil testing services for source qualifications.

- B. General:

1. Sufficient size samples shall be obtained from the potential borrow source to allow completion of tests listed in paragraph B below. Samples may be obtained from test borings, test pits, or from borrow pit faces provided that surficial dry or wet soil is removed to expose undisturbed earth. Tests listed below shall be performed on each sample obtained. A

minimum of three (3) representative samples from each potential borrow source shall be furnished to the testing laboratory for prequalification testing. Test data shall be provided to the Engineer a minimum of 2 weeks prior to construction for approval of borrow source. Three test reports completed within three months prior to construction may be submitted for commercial earth borrow sources or suppliers of stone products (crushed stone or graded stone products) in lieu of prequalification tests as approved by the Engineer.

- C. Material Tests:

1. Particle Size Analysis:
 - a. Method: ASTM D422
 - b. Number of Tests: One (1) per sample; three (3) per potential source.
 - c. Acceptance Criteria: Gradation within specified limits.
2. Maximum Density Determination:
 - a. Method: ASTM D1557 - Modified Proctor
 - b. Number of Tests: One (1) per sample; three (3) per potential source.
3. Re-establish gradation and maximum density of fill material if source is changed during construction.

3.2 PREPARATION

- A. Establish required lines, levels, contours and datum.
- B. Maintain benchmarks and other elevation control points; re-establish if disturbed or destroyed, at no additional cost to the Owner.
- C. Establish location and extent of existing utilities prior to commencement of excavation.

3.3 EXCAVATION

- A. All excavation shall be made to such depth as required and of the width shown on the Contract Drawings to provide suitable room for building the structures and laying the pipe(s) they are to contain and for sheeting, shoring, pumping and draining as necessary, and for removing peat, silt, or any other materials which the Engineer may deem unsuitable. Hand trench excavation may be required to protect existing utilities and structures.
- B. Trench excavation for pipes shall be made by open cut to accommodate the pipe or structure at the depths indicated on the Contract Drawings. Excavation shall be made to such a depth and to the width indicated on the Contract Drawings so as to allow a minimum of six (6) inches of pipe zone bedding to be placed beneath the bottom of all structures and barrels, bells or couplings of all pipes installed unless otherwise specified on the drawings.
- C. The bottom of the trench shall be accurately graded to provide a uniform layer of bedding material, as required, for each section of pipe. Trim and shape trench bottoms and leave free of irregularities, lumps, and projections.
- D. Stockpile excavated subsoil for reuse where directed or approved.
- E. Over excavation/under cut: If, in the opinion of the Engineer, existing material below the trench grade is unsuitable for properly placing bedding material and laying pipe, the Contractor shall excavate and remove the unsuitable material and replace the same with an approved pipe zone bedding material properly compacted.
- F. Stability of Excavation: Slope sides of excavations shall comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavation in safe condition until

completion of backfilling.

- G. Removal of materials beyond the indicated subgrade elevations, without authorization by the Engineer, shall be classified as unauthorized excavation and shall be performed at no additional cost to the Owner.

3.4 DEWATERING

- A. The Contractor shall remove all water from the excavation promptly and continuously throughout the progress of the work and shall keep the excavation dry at all times until the work is completed and excavation is backfilled or have sufficient weight to resist uplift pressures. Groundwater levels shall be depressed to a minimum of 2 feet below excavation subgrade. No pipe or structure is to be laid in water and water shall not be allowed to rise on or flow over any pipe or structure until such time as approved by the Engineer.
- B. Provide a suitable point of discharge from dewatering operations shall be conveyed in a non erosive manner satisfactory to the Engineer.
- C. Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes. All pipe lines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected.

3.5 BEDDING AND BACKFILLING

- A. All pipe trenches backfill (pipe zone bedding, pipe zone backfill and trench backfill) shall be compacted by tamping or rolling to achieve a minimum dry density of 90 percent of the modified Proctor maximum dry density of the material used (ASTM D1557). Backfill in pipe trenches to be covered with pavement shall be compacted to a minimum of 95 percent of modified Proctor maximum dry density. Backfill materials shall be placed with water content within plus or minus 4 percent of optimum moisture content per the modified Proctor method (ASTM D1557). Any water used for compaction shall be provided by the Contractor at his own expense. The Contractor is responsible for the repair of any trench settlement at no expense to the owner.
- B. Bedding and backfilling shall be accomplished in three stages unless otherwise specified on the Contract Drawings. The first stage shall involve placement of "pipe zone bedding" as a layer(s) of selected material required to support, or to stabilize unsound or unsatisfactory foundation conditions. The second stage shall involve placement of "pipe zone backfill" from the top of the bedding material up to one (1) foot above the pipe. The third stage involves the placement of "trench backfill" in the remainder of the trench up to the surface of the ground or the bottom of any special surface treatment subgrade elevation.
- C. The bedding material shall be placed in the trench after the trench has been excavated a minimum of six (6) inches below the bell of the pipe to permit the placing of not less than six (6) inches of bedding material unless otherwise specified on the Contract Drawings. Where, in the opinion of the Engineer, more than six (6) inches of bedding material shall be required, the excavation shall be performed and bedding placed to the depth ordered by the Engineer.
- D. Provide uniform bearing and support for each section of pipe at every point along the entire length, except where necessary to excavate for bell holes, pipe joints, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer, or wider than needed to make the joint connection properly.

- E. The bedding material shall be placed to the full width of trench. The bedding material shall be placed in loose lifts not exceeding six (6) inches to the elevation shown on the Contract Drawings or directed by the Engineer. The bedding material shall be tamped and compacted to form a firm and even bearing surface.
- F. Pipe zone backfill shall be placed to the elevation shown on the Contract Drawings in loose lifts not-to-exceed six (6) inches in thickness, before compaction. The backfill shall be placed on both sides of the pipe at the same time and to approximately the same elevation. Any pipe that is damaged or moved out of alignment, regardless of cause, shall be replaced or realigned at the Contractor's expense. Each layer shall be thoroughly compacted by hand-tamping or mechanical means being careful not to damage the pipe. When the pipe zone backfill reaches one (1) foot over the top of the pipe, the entire surface shall be compacted by mechanical means.
- G. The remainder, if any, of the trench above the pipe zone backfill shall be backfilled with suitable material in loose lifts not exceeding six (6) inches in thickness before compaction. Each layer shall be thoroughly compacted by mechanical means.

3.6 BACKFILLING AROUND STRUCTURES

- A. The Contractor shall not place backfill against any structure without obtaining the approval of the Engineer. No dumping shall be allowed where materials would flow against or around such structures. Backfill material shall be deposited in horizontal layers not exceeding 6 inches in loose thickness or as shown on the Contract Drawings and thoroughly compacted by hand or by mechanical means to the satisfaction of the Engineer.

3.7 SUSPENSION OF WORK

- A. Whenever the work is suspended, excavations shall be protected and the roadways, if any, left unobstructed. Within or adjacent to private property, material shall be stored at such locations as will not unduly interfere with traffic of any nature and in no case shall materials be stored in locations which will cause damage to existing improvements.

3.8 DISPOSAL OF MATERIAL

- A. Excess and unsuitable materials shall be disposed of by the Contractor on the site in an area approved by the Engineer or legally disposed of off- site at the Contractors expense.

3.9 FIELD QUALITY CONTROL

- A. Notify the Engineer at least three (3) working days in advance of all phases of filling and backfilling operations.
- B. In-place density testing shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:
 - 1. In-place relative density:
 - a. Method: AASHTO T238, Nuclear Method
- C. Perform initial density testing to verify that contractors proposed compaction effort will obtain the minimum required densities.

WESLEYAN UNIVERSITY

- D. In-place density tests on trench backfills shall be provided for every 500 cubic yards of fill and in vertical lifts not exceeding 12", and at least once daily.
- E. One particle size analysis (ASTM D422) and one modified Proctor compaction test (ASTM D1557) shall be completed for every 1,000 cubic yards of material placed.
- F. The owner may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions, at the Contractor's expense.
- G. Acceptance Criteria: The criteria for acceptability of in-place fill shall be in-situ dry density and moisture content. If a test fails to qualify, the fill shall be further compacted and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

END OF SECTION

SECTION 02510 - WATER DISTRIBUTION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 – General Requirements is made a part of this section.
- B. Summary: This Section includes water system piping for potable-water service and fire-protection service, outside the building.
 - 1. This Section does not include tapping of utility company water main by utility company and charging directly to Owner.
- C. Comply with NFPA 24, "Standard for the Installation of Private Fire Service Mains and Their Appurtenances," for materials, installations, tests, and flushing.
- D. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with City of Middletown Water Department (860 343 8085) requirements for products provided in this section. If discrepancies between specifications and local authority exists comply with requirements of local authority.

2.2 PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint, bell- and plain-spigot end unless grooved or flanged ends are indicated.
 - 1. Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Glands, Gaskets, and Bolts for Mechanical Joints: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.
 - 3. Gaskets for Push-on Joints: AWWA C111, rubber.
- B. Soft Copper Tube: ASTM B 88, Type K (ASTM B 88M, Type A) water tube, annealed temper.
 - 1. Copper Fittings: ASME B16.22; wrought-copper, solder-joint pressure type.
 - 2. Brazing Filler Metals: AWS A5.8, BCuP Series.
 - 3. Solder Filler Metal: ASTM B 32, lead-free type with 0.20 percent maximum lead content.

2.3 VALVES

- A. Nonrising-Stem, Resilient-Seated Gate Valves, NPS 3 (DN 80) and Larger: AWWA C509, gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut. Include 200-psig (1380-kPa) minimum working-pressure design, interior coating according to AWWA C550, and mechanical-joint ends.
- B. Nonrising-Stem Gate Valves: UL 262, FMG-approved iron body and bonnet with flange for indicator post, bronze seating material, and inside screw; 175-psig (1200-kPa) working pressure, and flanged end connections.
- C. Valve Boxes: Cast-iron box with top section and cover with lettering "WATER"; bottom section with base of size to fit over valve and barrel approximately 5 inches (125 mm) in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.
- D. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve.
- E. Curb Valves: Comply with AWWA C800. Include bronze body, ground-key plug or ball, and wide tee head, with inlet and outlet matching service piping material.

2.4 SPECIALTIES

- A. Fire Hydrants: UL 246, FMG-approved, cast-iron body, compression-type valve opening against pressure and closing with pressure; 150-psig (1035-kPa) minimum working-pressure design, with NPS 6 (DN 150) mechanical-joint inlet and with external hose thread used by local fire department. Include cast-iron caps with steel chains.
- B. Backflow Prevention Devices: ASSE standard backflow preventers, bronze body, 150-psig (1035-kPa) working pressure, of size indicated for maximum flow rate and maximum pressure loss indicated.
- C. Plastic Underground Warning Tapes: Polyethylene plastic tape, 6 inches (150 mm) wide by 4 mils (0.1 mm) thick, solid blue in color with metallic core and continuously printed black-letter caption "CAUTION--WATER LINE BURIED BELOW."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Connect water system piping and water-supply source and building water-distribution and fire-protection systems at the building wall in optimal locations and in accordance with pipe sizes required.
- B. Install restrained joints for buried piping within 60 inches (1500 mm) of building. Use restrained-joint pipe and fittings, thrust blocks, anchors, tie rods and clamps, and other supports at vertical and horizontal offsets.

- C. Install fittings for changes in direction and branch connections.
- D. Comply with NFPA 24 for fire-service-main piping materials and installation.
- E. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
- F. Install copper tube and fittings according to CDA's "Copper Tube Handbook."
- G. Bury piping with depth of cover over top of pipe to finish grade of at least 42 inches to provide maximum frost / freezing protection.
- H. Install continuous underground detectable warning tape during backfilling of trench for underground water-service piping. Locate below finished grade, 12" over piping.
- I. Clean and disinfect water distribution piping according to authorities having jurisdiction.

END OF SECTION 02510

SECTION 02621 POLYVINYL CHLORIDE PIPE

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the installation of polyvinyl chloride piping systems.
- B. All piping, fittings, and appurtenances shall be new, clean and in accordance with material specifications. In no instance will second-hand or damaged materials be acceptable.

1.2 REFERENCES

- A. American Water Works Association (AWWA).
- B. American Society of Testing and Materials (ASTM).
- C. National Sanitation Foundation (NSF).

1.3 QUALITY ASSURANCE

- A. Product Markings: Plainly and permanently mark each pipe length with the following information:
 - 1. Nominal pipe size.
 - 2. Plastic pipe material designation.
 - 3. Standard thermoplastic pipe dimension ratio.
 - 4. Pressure rating.
 - 5. ASTM designation.
 - 6. Manufacturers name or trademark and date of manufacture.
 - 7. Potable water pipe marking or seal, if applicable.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's catalog cuts, specifications and installation instructions.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Storage:
 - 1. Deliver and store pipe, fittings, specials, appurtenances and accessories and within the work limits as shown on the Drawings.
 - 2. Exercise special care during delivery and storage to avoid damage to the products.
 - 3. Store products in locations where unnecessary handling is avoided and where they will not interfere with the Owner's operations, construction operations or public travel.
- B. Handling:

1. Handle pipe, fittings, specials appurtenances and accessories carefully with approved handling devices in strict conformance with the manufacturer's recommendations.
 2. Do not drop or roll products off trucks, or otherwise drag, roll or skid products.
- C. Products cracked, gouged, chipped, dented or otherwise damaged will not be approved and are to be removed and replaced at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe and Fittings:

1. Pressure Pipe for Water Distribution: 4 inch through 12 inch conforming to AWWA C900. DR Series made from Class 12454-A or Class 12454-B virgin compounds in accordance with ASTM D1784.
2. Pressure Rated Sewer Pipe: 4 inch through 15 inch conform to ASTM D-2241 made from Class 12454-B virgin compounds in accordance with ASTM D1784, SDR 26.
3. Gravity Sewer: 4 inch through 15 inches conforming to ASTM D-3034 Type PSM. SDR 35.
4. Gravity Sewer: 18 inches through 27 inches conforming to ASTM F-679, wall thickness T-1.

B. Joints:

1. Join pipe joints, including fittings, shall be joined with an integral bell and spigot type rubber gasketed joint.
2. Conform to ASTM F-477 for gaskets and mark to indicate nominal pipe size and proper insertion direction.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect all pipe and fittings prior to laying in the trench. Remove defective pipe and fittings from the site.
- B. Do not backfill until inspection by the Engineer, unless otherwise approved by the Engineer.

3.2 INSTALLATION

- A. Conform to Section "Trenching and Backfilling."
- B. Conform to Section "Buried Pipe Installation."

3.3 TESTING

- A. Conform to Section "Buried Pipe Installation."

END OF SECTION

SECTION 02740 PAVEMENT SUBBASE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes provisions for prepared subbase courses for under walks and pavements.
- B. Proof rolling of subgrade for walks and pavements is included in this Section.

1.2 REFERENCES

- A. "State of Connecticut Department of Transportation Standard Specifications."
- B. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."
- C. "American Society for Testing and Materials (ASTM)."

1.3 SUBMITTALS

- A. Source Quality Control Test Reports: Submit samples directly to owner for all required material tests.

1.4 QUALITY ASSURANCE

- A. Field Testing and Inspection Service: Owner shall retain the services of an independent soil testing laboratory to provide soil testing during pavement subbase installation.

PART 2 - PRODUCTS

2.1 SOURCE QUALIFICATION TESTING

- A. Owner shall employ and pay for a qualified independent soil testing laboratory to perform soil testing services for source qualification.
 - 1. Obtain a 100-pound minimum representative sample from each potential aggregate source. Obtain samples for each different material gradation known to exist in the pit. Mix each sample thoroughly in accordance with AASHTO T87, and submit to the testing laboratory for reduction to specimen size. The laboratory shall perform the following tests in the order shown. Each material shall pass all tests in order to qualify.
 - a. Particle Size Analysis:

Method:	ASTM D422
Number of Tests:	Two (2) per potential source.
Acceptance Criteria:	Gradation within specified limits.
 - b. Plasticity Index Determination:

Method:	ASTM D424
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Number of Tests: One (1) particle size analysis on material passing no 40 mesh.

Acceptance Criteria: Plasticity Index within specified limits.

c. Maximum Density Determination:

Method: ASTM D1557 Modified Proctor

Number of Tests: Two (2) per potential source.

d. Magnesium Sulfate Soundness Loss Test:

Method: AASHTO Method T 104.

Number of Tests: Two (2) per potential source.

Acceptance Criteria: Five cycle loss within specified limits.

Re-establish subbase material properties if source is changed during construction.

2.2 MATERIALS

A. Processed Aggregate Base: Materials shall consist of sound, durable stone, sand, gravel or blends of these materials, conforming to the requirements of CONNDOT Section M.05.01 as follows:

TYPE	SIEVE	PERCENT PASSING
1	2-1/2"	100
	2"	95-100
	3/4"	50-95
	1/4"	25-45
	No. 40	5-20
	No. 100	2-12

1. Magnesium Sulfate soundness shall show a loss of not more than 15% at the end of five cycles, per AASHTO Method T104.
2. Plasticity Index shall conform to the requirements of CONNDOT M.02.06-2.
3. Not more than 30 percent, by weight, of the particles retained on a 1/2 inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than 3 times its least dimension.
4. All material shall meet the specified gradation prior to placement. All processing shall be completed at the source.

PART 3 - EXECUTION

3.1 PREPARATION

A. Establish required lines, levels, contours, and datum.

B. Maintain benchmarks and other elevation control points. Re-establish, if disturbed or destroyed, at no additional cost to Owner.

- C. Proof-roll existing subgrade to the satisfaction of the Engineer. Should the subbase course become unstable at any time prior to the placement of the overlying course(s), correct the unstable condition to the satisfaction of the Engineer. Replace unstable or weak subgrade materials with suitable material as provided in the Specifications.

3.2 INSTALLATION

- A. Place subbase material in uniform horizontal layers, with a maximum compacted thickness of 8 inches.
- B. Place subbase in a manner to avoid segregation. Uncontrolled spreading shall not be permitted.

3.3 COMPACTION

- A. Where subbase courses must be moisture-conditioned before compaction, uniformly apply water to the surface. Prevent free water from appearing on the surface during or subsequent to compaction operations.
- B. Compact all portions of each layer to a density not less than 95 percent of the maximum density.
- C. Final tolerances for the top surface of the subbase course requires that the surface does not extend more than ¼ inch above nor more than ¼ inch below the specified grade at any location.

3.4 TRAFFIC ON SUBBASE

- A. The movement of vehicular traffic over the final surface of the subbase may be permitted at locations designated by, and under such restrictions as ordered by the Engineer, provided such movements take place prior to the final finishing of this course to the specified tolerance. The movement of construction equipment on this course may be permitted, at locations designated by and under such restrictions as ordered by the Engineer at locations where permission is granted for such movement, the temporary surface of the course upon which the construction traffic is running, shall be placed and maintained for at least 2 inches above the final surface of this course. Just prior to paving, and after all construction traffic not required for the removal has ceased, remove the 2 inch protective layer, prepare the exposed surface of the course, and compact to the specified tolerance.
- B. Should the subbase become mixed with the subgrade or any other material, through any cause whatsoever, remove such mixture and replace it with the specified subbase material.

3.5 FIELD QUALITY CONTROL

- A. Notify the Engineer at least one (1) working day in advance of all phases of subbase installation.
- B. Comply with the requirements of this Section for in-place relative density testing.
 - 1. In-place relative density:

Method:	AASHTO T238, Nuclear Method
Number of Tests:	One (1) per specified interval.
Acceptance Criteria:	± Two (2) percent of specified percent compactions.
 - 2. Compaction tests shall be provided for every 1000 SY of subbase placement. A minimum of three for each lift is required.

WESLEYAN UNIVERSITY

3. The Engineer may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions.
4. Acceptance Criteria: The sole criterion for acceptability of in-place subbase shall be in situ dry density. Minimum dry density for all subbase shall be 95 percent of the maximum dry density. If a test fails to qualify, the fill shall be further compacted and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

END OF SECTION

SECTION 02741 ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes provisions for hot-mixed asphalt concrete paving over prepared subbase.

1.2 REFERENCES

- A. "Standard Specifications for Roads, Bridges, and Incidental Construction", Form 816.
- B. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."
- C. "American Society For Testing and Materials (ASTM)."

1.3 SUBMITTALS

- A. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.
- B. Field Test Reports: Submit results of field testing directly to the owner.

1.4 SITE CONDITIONS

- A. Weather Limitations: Apply tack coats when ambient temperature is above 50°F (10°C) and when temperature has not been below 35°F (10°C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
- B. Construct hot-mixed asphalt concrete surface course when atmospheric temperature is above 40°F (4°C) and when base is dry. Base course may be placed when air temperature is above 30°F (minus 10°C) and rising.
- C. Grade Control: Establish and maintain required lines and elevations.
- D. In no instance shall the materials and thicknesses of pavement and subbase courses replaced be less than that removed, unless approved by the Engineer.

1.5 SEQUENCING AND SCHEDULING

- A. Coordinate the placement of asphalt concrete pavement with the completion of underground work by other trades.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Asphalt concrete and all related items shall meet the requirements of Form 816 M.04.01.

- B. Binder Course: Form 816, M.04.03 Class 1.
- C. Top Course: Form 816, M.04.03 Class 2.
- D. Tack Coat: Emulsified asphalt, ASTM D977.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. General: Remove loose material from compacted subbase surface immediately before commencing paving operations.
- B. Proof-roll prepared subbase surface with a ten-ton static, steel-wheel roller to check for unstable areas and areas requiring additional compaction, witnessed by the Engineer at least forty-eight (48) hours prior to scheduled paving operations.
- C. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.
- D. Sawcut edges of existing pavement to achieve straight line transitions between old and new pavement. Make a second sawcut through the top course of existing pavement, 18 inches from the first cut to provide a staggered joint.
- E. Tack Coat: Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.03 to 0.07 gallons per square yard of surface.
- F. Allow to dry until at proper condition to receive paving.
- G. Exercise care in applying bituminous materials to avoid smearing of adjoining surfaces. Remove and clean damaged surfaces.
- H. Do not commence pavement replacement operations until all buried work beneath pavement repair has been completed to the satisfaction of the Engineer.
- I. Where trench dimensions preclude the use of proof rolling equipment, demonstrate the stability of the subgrade and subbase through other means, as acceptable to the Engineer.

3.2 PLACING AND COMPACTING MIX

- A. General: Place and compact asphalt pavement courses in accordance with Form 816, unless otherwise specified.
- B. Place inaccessible and small areas by hand, and compact with hot hand tampers or vibrating plate compactors.
- C. Slope/Chamfer exposed edges of walks at 45° angle where walks do not abut curb.
- D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure

continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

- E. Place tack coat between successive courses if more than forty-eight (48) hours have elapsed after placing the preceding course. Apply tack coat at a rate of 0.03 to 0.07 gallons per square yard of surface.
- F. Compaction: Compact asphalt pavement courses with a static steel wheel roller only, unless otherwise approved by the Engineer, based upon work conditions.
- G. Remove and patch areas of any asphalt concrete course deemed unsatisfactory by the Engineer, at the Contractor's expense. Remove hardened or set asphalt by saw cutting.
- H. Adhere to Form 816 compaction requirements. This, however, shall not relieve the Contractor of his responsibility to provide a well densified pavement. It shall be the Contractor's obligation to recognize difficulties in compacting the mix, and to make appropriate corrections.
- I. Roll and compact the asphalt concrete course until the finished surface is free from depressions, waves or other defects that would prevent proper drainage. The finished surface shall be uniform in texture and appearance.
- J. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- K. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.3 FIELD QUALITY CONTROL

- A. General: Testing in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness will be done by Owner's testing laboratory. Repair or remove and replace unacceptable paving as directed by Engineer.
- B. Thickness: In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:
 - 1. Base Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus or minus 1/4 inch.
 - 3. Cumulative Thickness Tolerances: Plus or minus 1/4 inch for nominal cumulative thicknesses less than or equal to 4 inches. Plus or minus 1/2 inch for nominal cumulative thicknesses greater than 4 inches.
- C. Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
 - 1. Base Course Surfaces: 1/4 inch.
 - 2. Wearing Course Surface: 3/16 inch.

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.
- D. Check surface areas at intervals as directed by Engineer.
- E. Scuff Resistance: If, in the opinion of the Engineer, the pavement does not demonstrate reasonable resistance to deformation by punching loads and scuffing under horizontally applied shearing loads, after the pavement has cooled and hardened, the Engineer may require laboratory testing of cored pavement samples to determine the properties of the pavement; including aggregate gradation, asphalt content, air void ratio, density and any others deemed appropriate. If laboratory testing indicates that any parameters substantially deviate from the design mix tolerances specified, replace the affected areas of pavement at no additional cost, and reimburse the Owner for all costs incurred in procurement and testing of cores.

END OF SECTION

SECTION 02815 PRECAST CHANNEL DRAINAGE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. All materials, labor and equipment necessary to install a precast, interlocking polymer concrete trench drainage system as specified and as shown on the working drawings, shall be included.
- B. System Description: Modular trench drain system precast from a corrosion resistant polymer including interlocking modular components for on-site installation.

1.2 QUALITY ASSURANCE

- A. Warranty
 - 1. Channel drain system is included under the Project Warranty.

1.3 SUBMITTALS

- A. Contractor will submit shop drawings showing a plan of the total drainage system listing all parts being provided with exact center-line dimensions suitable for installation. Copies of the manufacturer's recommended method of installation, assembly, and anchorage shall be submitted for review.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Physical and Mechanical Characteristics of Polymer Concrete Channel Units
 - 1. Top unit width - Approximately 6.1 inches
 - 2. Internal width - Approximately 4.0 inches
 - 3. Unit depth - Approximately 9.8 inches
 - 4. Compressive strength of specified polymer concrete - 14,000 psi min.
 - 5. Flexural strength of specified polymer concrete - 4,000 psi min.
 - 6. Water absorption rate - not to exceed 0.1%
- B. Channel Profile shall include positive interlocking tongue and groove connections which can be sealed to provide water tight connections. Each precast polymer channel shall be an approximately 1 meter unit and be available in curved and straight sections.
- C. Catch Basins shall be precast polymer concrete, 39.37" in length and include a plastic grating.
- D. Channel Drainage System, Zurn, ACO or approved equal.
- E. Grates:

1. Grates are to be ADA compliant, high density polyethylene. Color: Black.
2. Grate locking devices are to be galvanized steel.

PART 3 - EXECUTION

3.1 SITE PREPARATION

- A. Excavate the area for channel placement wide enough to accommodate the channel size with a minimum of six inch concrete encasement. Channels require a minimum of six inches concrete support, and top of channel must be evenly aligned to the surface of the surrounding surface on both sides, as well as underneath the channel.

3.2 INSTALLATION

- A. Install precast channel drain in accordance with the details on the plans and the manufacturers instructions.
- B. Channel sections are installed from the outlet ends of the system, working from the catch basins. Insert channels from above to allow ends to interlock. Channel sections shall be placed on brick, rebar basket, channel chair, low slump concrete grout slurry, or suspended to obtain correct finished elevation. Cutting will be made, if required, by masonry or concrete saw. Cover top of channel with tape, plastic, or plywood strips to protect the channel surface from concrete during pouring.
- C. Finishing and Cleanup
 1. Following final set of concrete, remove protection covering top of channels.
 2. Install drain system in strict accordance with manufacturer's recommendations and shop drawings.

END OF SECTION

SECTION 02920 - LAWNS AND GRASSES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 – General Requirements is made a part of this section.
- B. Submittals: Product certificates and planting schedule.
- C. Sod: Comply with TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."
- D. Maintenance: Water, fertilize, weed, mow, trim, and establish lawns. Replant non-uniform, bare, or eroded grassed areas and remulch. Maintain for not less than 30 days.
- E. CONN-DOT 816: Standard Specifications for Roads, Bridges and Incidental Construction

PART 2 - PRODUCTS

2.1 GRASSES

- A. Seed Species: State-certified seed of grass species, as follows:

1. Seed Mixture:

a. Sun and shade mix

PERC	Fine Textured Grasses	Germ
39.5%	Accent Perennial Rye	90%
39.43%	Aberdeen Creeping Red Fescue	88%
19.57%	Brooklawn Kentucky Bluegrass	85%

- b. Submit seed mixture to Owner for approval.

- 2. Per Owner’s direction, the use of drought resistant, hard, red and chewing fescues. varieties in appropriate new locations identified on campus shall be planted.

- B. Turfgrass Sod: Certified Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding."

- 1. Species: Submit species to Owner for approval.

2.2 SOILS AND AMENDMENTS

- A. Topsoil: ASTM D5268, free of stones 1 inch or larger.

- B. Lime: ASTM C602, Class T, agricultural limestone.
- C. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8.
- D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
- E. Commercial Fertilizer: Organic grade fertilizer formula including corn gluten and soybean.
- F. Grub, Crabgrass, Broadleaf Weeds and Insect Control: Contact Dave Hall @ 860-685-3764 for product requirements.
- G. Straw Mulch: Clean, mildew- and seed-free salt hay or threshed straw.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Loosen subgrade, remove stones, sticks, existing grass, vegetation, and other extraneous materials.
 - 1. At newly graded subgrades, spread planting soil mixture to a depth of 4 inches but not less than required to meet finish grades.
 - 2. At unchanged grades, apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
- B. Grade lawn areas to a smooth, even surface with loose, uniformly fine texture. Moisten before planting.

3.2 PLANTING

- A. Seeding Lawns: Evenly distribute seed by sowing with a spreader or a seeding machine. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray. Protect seeded areas by spreading straw mulch 1-1/2 inches in loose depth. During the first 3 weeks, water 3 times daily.
 - 1. Seeding Rate: 3 to 4 lb/1000 sq. ft.
- B. Sodding Lawns: Lay sod with tightly fitted joints, offsetting joints in adjacent courses. Tamp and roll lightly to form a smooth surface. Fill minor cracks between pieces of sod with soil or sand. Anchor sod on slopes exceeding 1:6 with wood pegs. Saturate sod with fine water spray within two hours of planting. During first week, water daily.
- C. Disposal: Remove surplus soil and waste material and legally dispose of off Owner's property. Adhere to Urban fill policies related to potential soil contaminants.
- D. END OF SECTION 02920

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

SECTION REQUIREMENTS

- A. Division 1 – General Requirements is made a part of this section.
- B. Submittals: Product Data and concrete mix designs.
- C. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.
- D. Comply with ACI 301, "Specification for Structural Concrete"; ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"; and CRSI's "Manual of Standard Practice."

TESTING

- A. Sampling and testing for quality assurance during placement of concrete includes the following:
 - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 2. Slump: ASTM C 143; one test for each concrete load at point of discharge from truck, and one test for each set of compressive strength test specimens.
 - 3. Air Content: ASTM C 231 pressure for normal weight concrete, ASTM C173 volumetric method for light weight concrete; one for each set of compressive strength test specimens.
 - 4. Concrete Temperature: Test hourly when air temperature is 40 degrees F. (4 degrees C.) and below, and when 80 degrees F (27 degrees C), and above; and each time a set of compressive test specimens are made.
 - 5. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field cure test specimens are required.
 - 6. Compressive Strength Tests: ASTM C 39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 - a. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - b. When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - 7. Test results will be reported to Engineer and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, name of concrete supplier, concrete type and class, location of concrete batch in structure, design

- compressive strength at 28 days, air content, slump, concrete temperature, compressive breaking strength and type of break for both 7-day tests and 28 day tests.
8. Additional Tests: The testing service will make additional tests of in place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when concrete placed does not conform to the specified limits of the Contract Documents or when unacceptable concrete is verified.
- B. Mock-ups: Provide samples of smooth formed, rubbed and light broom finishes to demonstrate typical joints, surface finish, color, texture, tolerances and standard of workmanship.
- C. Additional Tests: The testing service will make additional tests of in place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure as directed by the Engineer. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when concrete placed does not conform to the specified limits of the Contract Documents or when unacceptable concrete is verified.

SUBMITTALS

- A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, moisture barrier and others as requested by the Owner.
- B. Shop Drawings; Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI Detailing Manual - 1988, Publication SP-66, showing bar schedules, stirrup spacing, diagrams of bent bars, placing plans and wall elevations showing arrangement of concrete reinforcement. Reproduction of the Owner's Contract Drawings are not acceptable for use as shop drawings.
- C. Certificates of Compliance: Provide the Special Inspector with Certificates of Compliance for welded wire fabric, cement, air- entraining agent, water-reducing agent, and vapor barrier.
- D. In addition provide mill test reports for reinforcement bars used for this project.
- E. Batch Tickets: The General Contractor shall furnish to the Special Inspector tester with each batch of concrete and before unloading at the site, a delivery ticket on which is printed, stamped, and or written, information concerning said concrete as follows
- Name of ready-mix batch plant,
 - Serial number of ticket,
 - Date,
 - Truck number,
 - Name of purchaser,
 - Specific designation of job (name and location),
 - Specific class or designation of concrete in conformance with that required by job specifications,
 - Amount of concrete in cubic yards,

- Time loaded or of first mixing of cement and aggregates,
- Quantity of water added by receiver of concrete and his initials,
- Type and brand, and amount of cement,
- Type and brand, and amount of admixtures,
- Total water content by producer (or W/C ratio),
- Maximum size of aggregate,
- Weights of fine and coarse aggregate,
- Signature or initials of ready-mix representative.

- F. Test Reports: Submit for review laboratory test reports for concrete materials and mix design test as specified.

PART 2 - PRODUCTS

ACCEPTABLE SUPPLIERS:

- A. SUZIO
- B. TILCON
- C. Approved equal

MATERIALS

FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-place concrete without bow or deflection.
 - 1. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.
 - 2. Provide Class A tolerances for concrete exposed to view.
- B. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.
 - 1. Unitex Farm Fresh Vegetable Oil Form Release
- C. Reinforcing Bars: ASTM A615 **Grade 60**, deformed.
- D. Plain Steel Wire: ASTM A82, plane, cold-drawn steel.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A185, fabricated from as-drawn steel wire into flat sheets. Size and weight as noted on the drawings.

- F. Joint Dowel Systems at patio entries:
1. Expansion Joints: Diamond Dowel System: ¼” thick stainless steel plate, 4.5” x 4.5” square at 24 inches on center with Diamond Dowel pocket former as manufactured by PNA Construction Technologies.
 2. Control Joints: Square Dowel Basket Assemblies: ¾” x 14” stainless steel square dowel at 14” on center. Side frame supports fabricated from ¼” diameter cold drawn wire per ASTM A108 grade 1010-1020. Square dowel clips extend at least 2” past center of the dowel. PNA clip with foam on each side of dowel extending to within +/- 3/16” of 2/3 length of the dowel to allow for horizontal movement. System as manufactured by PNA Construction Technologies.
- G. Joint Dowel System at street line sidewalk:
1. #5 epoxy painted rebar dowels shall be cast-in place 12” O.C. with an 18” leg sheath. Expansion joint filler and joint sealant shall be as specified. Concrete joints between expansion joints shall be tooled.

CONCRETE MATERIALS

- A. Portland Cement: ASTM C150, Type I unless otherwise acceptable to the Owner. Use one brand of cement throughout project, unless acceptable to Engineer/Owner. Select cement color acceptable to the Owner.
- B. Pozzolonic materials which will darken the concrete surface, such as fly-ash and microsiliaca are not permitted.
- C. Normal Weight Aggregates: ASTM C33, uniformly graded. Provide aggregates from a single source for exposed concrete. Sizes as noted on the drawings.

FIBER REINFORCEMENT

- A. Synthetic Fiber: ASTM C1116, Type III, polypropylene fibers, 1/2 to 1-1/2 inches long.
- B. Water: Potable.
- C. Water-Reducing Admixture: ASTM C494, Type A and not containing more chloride ions than are present in municipal drinking water.
- D. Air-Entraining Admixture: ASTM C260.
- E. Waterproofing Membrane: Bituthene 3000 self-adhesive rubberized asphalt/polyethylene waterproofing membrane adjacent to the building structure by Grace Construction Products www.graceconstruction.com or approved equal. Contractor shall apply WP 3000 or Primer B2 prior to installing the waterproofing membrane.
- F. WaterStop: Continuous bentonite waterstop along the abutting building structures – provide 3” of coverage.
 1. Waterstop shall be Volclay RX-101RH and adhered to the building structure with Volclay WB adhesive.
 2. Waterstop shall be installed below the expansion joint filler.

- G. Vapor Retarder: Clear 12-mil thick polyethylene sheet or reinforced polyethylene sheet, ASTM E 1745, Class C.
- H. Expansion joint filler shall be Sealtight® Fibre Expansion Joint by W.R. Meadows, Inc., www.wrmeadows.com – 1-800-342-5976 or approved equal. Thickness shall be ½". Expansion joint filler shall also be placed against abutting building structures, columns, curbs and at all interrupting objects. Expansion joints shall be set ½" below the concrete surface and filled with the appropriate specified joint sealant.
- I. Contractor shall install joint sealant over all expansion joint filler installed. Joint sealant shall be DynaTred® non-sag, traffic-grade polyurethane sealant by Pecora Corporation www.pecora.com – 1-800-523-6688 or approved equal. Submit manufacturer's standard color options to Owner for review and selection.

CONCRETE REPAIR MATERIALS

- A. Bonding Agent / Primer: Ardex Bonding & Anti Corrosion Agent, Silpro C-21 All Acrylic Bonding Agent / Primer or approved equal.
- B. Concrete Patch Material: Ardex CP Concrete Patch, Silpro Easy Patch or approved equal.
- C. Concrete Resurfacing Material: Ardex CD Concrete, Silpro Fastcrete or approved equal.

<http://www.ardex.com/default.asp>

<http://www.silpro.com/>

CURING AND SEALING COMPOUND

- A. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C1315, Type 1, Class A.
- B. Concrete Color Admixture: Submit color samples for Owner approval.
- C. Sidewalks
 1. Concrete for sidewalks and aprons shall conform to the requirements of Section 9.21 and M.03 of the State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges and Incidental Construction", Form 814A, including current supplemental. Higher compressive strengths may be required by the Owner.
 2. The gravel or reclaimed miscellaneous aggregate base shall be placed in layers not less than 8 inches in depth and to such a depth that after compaction it shall be at the specified depth below the finished grade of the walk. The base shall be wetted and rolled or tamped after the spreading of each layer.
 3. The sidewalk expansion joints at the street line (EJ@SL) shall be at a maximum of 20'-0". #5 epoxy painted rebar dowels shall be cast-in place 12" O.C. with an 18" leg sheath. Expansion joint filler and joint sealant shall be as specified. Concrete joints between expansion joints shall be tooled.

4. Expansion joint filler shall be Sealtight® Fibre Expansion Joint by W.R. Meadows, Inc., www.wrmeadows.com – 1-800-342-5976 or approved equal. Thickness shall be ½". Expansion joint filler shall also be placed against abutting building structures, columns, curbs and at all interrupting objects. Expansion joints shall be set ½" below the concrete surface and filled with the appropriate specified joint sealant.
5. Contractor shall install joint sealant over all expansion joint filler installed. Joint sealant shall be DynaTred® non-sag, traffic-grade polyurethane sealant by Pecora Corporation www.pecora.com – 1-800-523-6688 or approved equal. Submit manufacturer's standard color options to Owner for review and selection.
6. Expansion joint filler shall be installed against the existing concrete curb and sealed with the specified joint sealant.

PROPORTIONING AND DESIGN OF MIXES

Prepare design mixes for each type and strength of concrete in accordance with ACI 318 Section 5.3 "Proportioning on the Basis of Previous Field Experience or Trial Mixtures", as indicated on drawings.

Use an independent testing facility acceptable to Engineer for preparing and reporting proposed mix design. The testing facility shall not be the same as used for field quality assurance testing unless otherwise acceptable to Engineer.

Submit written reports to Engineer for each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed and approved by Engineer.

Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job condition, weather test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in work.

Water Cement Ratio: All concrete to have a water to cementitious materials ratio of not more than 0.45.

Strength: All concrete to have a twenty-eight day compressive strength (f'_c) of not less than 4000 psi unless otherwise noted.

Slump Limits: The concrete shall be proportioned and produced to have a slump of 2 inches to 4 inches. Concrete of lower slump may be used provided it is properly placed and consolidated.

Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer/Owner before using in Work.

Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.

CONCRETE MIXING

Ready-Mix Concrete: Comply with requirements of ASTM C 94 "Standard Specification for Ready-Mixed Concrete", and as herein specified.

Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch **will not** be permitted.

During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

When outdoor air temperature is between 85 degrees F (30 degrees C) and 90 degrees F (32 degrees C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F (32 degrees C), reduce mixing and delivery time to 60 minutes. Select strength from options in subparagraph below or revise to suit Project.

7.

PART 3 – EXECUTION

3.1 FORMS

Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structures.

Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. The Contractor is solely responsible for the safe design and installation of formwork and supports.

Design Formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.

Construct forms complying with ACI 347, "Recommended Practice for Concrete Formwork", to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures.

Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes.

Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

Provide Class A tolerances for concrete exposed to view.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

Provide temporary openings where interior area of formwork is inaccessible for clean out, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

Chamfer exposed corners and edges unless otherwise specified, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is at least 1-1/2" inside concrete. Unless otherwise shown, provide form ties which will not leave holes larger than 1" diameter in concrete surface.

Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Re-tighten forms and bracing after concrete placement if required to eliminate mortar leaks and maintain proper alignment.

3.2 PLACING REINFORCEMENT

Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified. Clean reinforcement of loose rust and mill scale, old concrete, earth, ice, and other materials which reduce or destroy bond with concrete.

Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

Place reinforcement to obtain at least minimum coverages indicated on the Contract drawings for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. All reinforcement must be completely supported and secured against possible displacement prior to placing concrete in any portion of the scheduled placement.

Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lap splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

Concrete reinforcement shall be erected from shop drawings displaying the Engineer's stamp of acceptance only. In the event a conflict exists between the accepted shop drawing and the Contract Documents the conflict shall be brought to the immediate attention of the Engineer for resolution.

3.3 JOINTS

- A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Engineer/Owner. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs, and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints. Reference design drawings.

- B. Isolation Joints in Slabs-on-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated. Joint filler and sealant materials are specified in Division 7.
- C. Control Joints in Slabs-on-Ground: Construct control joints in slabs-on-ground to form panels or patterns as shown. Use inserts or saw-cut 1/4" wide x 1/5 to 1/4 of the slab depth, unless otherwise indicated.

3.4 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instruction and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.5 PREPARATION OF FORM SURFACES

- A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- C. Coat steel forms with a non-staining, rust-preventative material. Rust-stained steel formwork is not acceptable.

3.6 CONCRETE PLACEMENT

- A. Pre-placement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel and items to be embedded or cast-in. Notify other crafts to permit installation of their work. Cooperate with other trades in setting such work. Coat forms with sealer as specified in Section 2.01 of these specifications.
- B. Notify testing/inspection agency of intent to place concrete at least 48 hours prior to placement. Perform complete pre-placement inspection of formwork, reinforcement and condition of base prior to arrival of inspector. For each placement Contractor will provide the Special Inspector with a written record of the quality control inspection performed by and signed by the Contractor.
- C. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- D. General: Comply with ACI 304, "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", and as herein specified. Deposit concrete continuously or in layers of such thickness that in concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

- E. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
- F. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- G. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate without causing segregation of mix.
- H. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- I. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- J. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- K. Maintain reinforcing in proper position during concrete placement operations. Do not use calcium chloride, salt and other materials containing anti-freeze agents or chemical accelerators, unless otherwise accepted in mix designs.

3.7 FINISH OF SURFACES

- A. Rough Form Finish (RfFm-Fn): For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish (SmFm-Fn): For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Smooth-Rubbed Finish (SmRbd-Fn): Provide smooth rubbed finish (SmRbd-Fn) to scheduled concrete surfaces exposed to-view, which have received smooth form finish (SmFm-Fn) treatment, not later than one day after form removal. Moisten concrete surfaces and rub with Carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

3.8 MONOLITHIC SLAB FINISHES

- A. Scratch Finish (Scr-Fn): Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tiles, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to a tolerance not exceeding 1/4" in 2'-0" when tested with a 2' straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushes, brooms or rakes.
- B. Floated Finish (Flt-Fn): Apply floated finish to monolithic slab surfaces to receive light broom finish as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

- C. After screeding and consolidating concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power driven floats, or both. Consolidate surface with power driven floats, or by hand- floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 1/4" in 10" when testing with a 10' straight edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth granular texture.
- D. Light Broom Finish: Apply light broom finish to platforms, steps, landings, and for exterior or interior pedestrian ramps. After completion of float finishing, lightly draw broom over concrete surface and apply chemical-hardener finish at platform as specified above.

3.9 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- B. Curing Methods: Perform curing of concrete by moist curing, by
 - 1. Keep concrete surface continuously wet by covering with water a minimum of 7 days.
 - 2. Continuous water-Fog Spray.
- C. Surfaces shall be kept continuously moist for not less than 7 - days after finishing.
 - 3. Covering concrete surface with non-staining absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
 - a. Ultra Care wet curing blankets or approved equal.
- D. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above as applicable.

3.10 SHORES AND SUPPORTS

- A. For shoring and reshoring comply with ACI 347 "Recommended Practice of Concrete Formwork", and as herein specified.
- B. Remove shores and restore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.
- C. Keep reshores in place until concrete has attained its required 28-day strength and heavy loads due to construction operations have been removed.

3.11 REMOVAL OF FORMS

- A. Formwork such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees for 24 hours after placing concrete, except as noted below, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

- B. Formwork for concrete to receive a rubbed finish shall be removed within 24 hours of placement to allow proper finishing.
- C. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, when removed for finishing, must immediately be replaced with shoring. Shoring shall remain in place until concrete has achieved its design strength.

3.12 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surface, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.13 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.

3.14 CONCRETE SURFACE REPAIRS

- A. A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Engineer.
- B. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete, but in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Before placing cement mortar or proprietary agent, brush-coat the area to be patched with neat cement grout or proprietary bonding agent.
- C. For exposed-to-view surfaces, blend white Portland cement and standard portland cement so that when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixtures and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surfaces.
- D. Repair of formed Surfaces: Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
- E. Repair concealed formed surfaces, where possible, that contain defects that affect the reliability of concrete. If defects cannot be repaired, remove and replace concrete.
- F. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness, using a template having required slope.
- G. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
- H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- I. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to

- blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Engineer.
- J. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and brush with a neat cement grout, or apply concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
 - K. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and brush with neat cement grout, or apply concrete bonding agent. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
 - L. Use epoxy-based mortar, approved by the Engineer, for structural repairs. Structural repairs include, but are not limited to, areas of unsound (honeycombed or spalled) concrete with a surface area greater than 9 square inches and/or with a depth greater than 1.5 inches, areas where reinforcement is exposed or areas with cracks greater than 1/16 inch in width. All areas requiring a structural patch shall be approved by the Engineer prior to commencing patching operations.
 - M. Concrete Sealer: Contractor shall apply low gloss, surface sealer at after concrete has cured for 28 days. Surface sealer shall be applied to patio entry surfaces, sidewalks and stamped concrete.
 - N. Patio Sidewalk: Contractor shall apply a compatible sealer over the concrete 28-days after concrete placement.
 - O. Street Line Sidewalks: Contractor shall apply a compatible sealer over the concrete 28-days after concrete placement
 - P. Stamped Concrete; Bomanite HydroLock. Water film forming acrylic/epoxy. Solids content: 22%, VOC content <130 grams/liter. Low gloss.

END OF SECTION 03300

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 – General Requirements is made a part of this section.
- B. Submittals: Shop Drawings showing details of fabrication and installation.
- C. Submittal shop drawings shall be based upon completed field layout and field drilling of all holes to ensure fabricated steel is accurate.
- D. Professional Engineer's stamp is required on shop drawings for railings and stairs.

PART 2 - PRODUCTS

2.1 METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.
- C. Cast Iron: ASTM A 48/A 48M, Class 30.
- D. Academic / Administrative Buildings: Standard Steel Handrails, Railings, Cast Flanges and Fittings (hot dipped galvanized):
 - 1. Provide products by J.G. Braun
 - 2. Top Handrail: J.G. Braun steel handrail #1256 (1 ½" x ½" x 1/8")
 - 3. Posts: Square steel tube (stainless or composite) 200 # force minimum): 1 ¼" square steel tube @ 4'-0" O.C. (Typ.)
 - 4. Ballusters: ½" square steel tube every 4" O.C. (Typ.)
 - 5. Bottom Rail: 1 ½" x ½" x 1/8" steel bottom rail.
 - 6. Malleable Iron Floor Flange: J.G. Braun #8163 flange at all Posts (Typ.)
 - 7. Handrail: 1 ¼" diameter, custom fabricated.
 - 8. Handrail termination: Bending of handrail at starting and ending termination points shall be detailed and submitted for approval. Coordinate details with Owner and University standards.
 - 9. Fabrication: All rails shall be shop fabricated.
- E. Woodframe Houses: Standard Steel Handrails, Railings and Fittings (hot dipped galvanized):
 - 1. Top Handrail: 1 ½" x ½" x 1/8" (submit top rail profile to Owner for approval).
 - 2. Posts - Square steel tube 200 # force: minimum 1 ¼" square steel tube @ 4'-0" O.C. (Typ.)
 - 3. Ballusters: ½" square steel tube every 4" O.C. (Typ.)
 - 4. Bottom Rail: 1 ½" x ½" x 1/8" steel bottom rail.
 - 5. Floor Flange / Plate: 4" x 4" or sized as required based on field conditions. **Only required for precast concrete stair installations or at any other location that cannot be cored and grouted.**
 - 6. Handrail: 1 ¼" diameter, custom fabricated.

7. Handrail termination: Bending of handrail at starting and ending termination points shall be detailed and submitted for approval. Coordinate details with Owner and University standards.
8. Fabrication: All rails shall be shop fabricated.

2.2 GROUT

- A. Non-shrink, Nonmetallic Grout: ASTM C 1107; recommended by manufacturer for exterior applications.

2.3 ACCEPTABLE FABRICATOR

- A. AISC Certified Fabricator

2.4 FABRICATION

- A. Contractor shall submit recycled use content and recycling program.
- B. General: Shear and punch metals cleanly and accurately. Remove burrs and ease exposed edges. Form bent-metal corners to smallest radius possible without impairing work. Shop fabrication shall not commence until field template and hole drilling are complete and approved by the structural engineer.
- C. Field joints shall not be allowed.
- D. Welding: Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. At exposed connections, finish welds and surfaces smooth with contour of welded surface matching those adjacent.
- E. On units indicated to be cast into concrete or built into masonry, core, with a minimum 6-inch embedment. Crown/slope grout.
- F. Fabricate nosings from cast iron with an integral abrasive finish.
 1. Apply bituminous paint to concealed surfaces of units set into concrete.
- G. Fabricate nosings from extruded aluminum with abrasive filler consisting of aluminum-oxide or silicon-carbide grits, or a combination of both, in an epoxy-resin binder.
 1. Ribbed-type units.
 2. Apply clear lacquer to concealed surfaces of units set into concrete.

2.5 STEEL AND IRON FINISHES

- A. Hot-dip galvanized steel fabrications at exterior locations.
- B. Prepare uncoated ferrous metal surfaces to comply with SSPC-SP 6, "Chemical Bath Cleaning," and paint with a fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79. Apply two coats of exterior final finish paint in the shop. Touch up as required in the field. Final color shall be coordinated with the Owner.

PART 3 - EXECUTION

3.1 INSTALLATION

WESLEYAN UNIVERSITY

- A. Field measure as required to obtain dimensions needed for fabrication. Fabrication dimensions shall meet or exceed all required code requirements based on installation location.
- B. Provide center rail for all widths greater than 6'-0".
- C. Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack.
- D. Slope all posts in epoxy. Embedment shall be minimum 6 inches. **Slope epoxy as required to eliminate water ponding.**
- E. Fit exposed connections accurately together to form hairline joints.
- F. Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

END OF SECTION 05500

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1: General Requirements are made apart of this requirement.
- B. Submittals: Model code evaluation reports for treated wood, engineered wood products, foam-plastic sheathing and building wrap, product data sheets for all products being used, samples of all products being used, shop drawings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. **All wood products shall be certified by the Forest Stewardship Council.**
- B. Lumber: Provide dressed lumber, S4S, 19 percent maximum moisture content for 38-mm actual thickness or less, marked with grade stamp of inspection agency.
- C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
- D. Wood Structural Panels: DOC PS 2. Provide plywood complying with DOC PS 1, where plywood is indicated.
 - 1. Comply with "Code Plus" provisions in APA Form No. E30K.

2.2 TREATED MATERIALS

- A. Preservative-Treated Materials: AWPA C2 lumber and AWPA C9 plywood, labeled by an inspection agency approved by ALSC's Board of Review. After treatment, kiln-dry lumber and plywood to 19 and 15 percent moisture content, respectively. Treat indicated items 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 less than 460 mm above grade.
 - 4. Wood floor plates installed over concrete slabs directly in contact with earth.
- B. Fire-Retardant-Treated Materials: Comply with performance requirements in AWPA C20 lumber, labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber. Moisture Content: no greater than 19% for lumber and no greater than 15% for plywood.
 - 2. Use Interior Type A High Temperature (HT), unless otherwise indicated.

2.3 LUMBER

- A. Dimension Lumber: The following grades are per inspection agency indicated:
 - 1. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 3: Eastern softwoods: NELMA; Northern species: NLGA;.
 - 2. Framing Other Than Non-Load-Bearing Partitions: No. 2: Hem-fir: NLGA, WCLIB, or WWPA;.
 - 3. Exposed Framing: No. 2, hand selected: Hem-fir: NLGA, WCLIB, or WWPA; Spruce-pine-fir: NELMA, NLGA, WCLIB, or WWPA;.
- B. Concealed Boards: 19 percent maximum moisture content: Northern species: No. 2 Common per NLGA rules;.
- C. Miscellaneous Lumber: Construction, Stud, or No. 3 grade of any species for nailers, blocking, and similar members.

2.4 ENGINEERED WOOD PRODUCTS

- A. Engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be demonstrated by comprehensive testing.
- B. Laminated-Veneer Lumber: Manufactured with exterior-type adhesive complying with ASTM D 2559. Allowable design values determined according to ASTM D 5456.
 - 1. Extreme Fiber Stress in Bending, Edgewise: 17.9 MPa for 286-mm actual- depth members.
 - 2. Modulus of Elasticity, Edgewise: 12 400 MPa.
- C. Wood I-Joists: Prefabricated units complying with APA PRI-400 with timber flanges; depths and performance ratings not less than those indicated.
 - 1. Web Material: Either oriented strand board or plywood, Exposure 1.
 - 2. Structural Capacities: Establish and monitor structural capacities according to ASTM D 5055.
 - 3. Trademark: Factory mark I-joists with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and I-joist compliance with APA standard.
- D. Rim Boards: Performance-rated product complying with APA PRR-401.
 - 1. Thickness and Grade: 28-mm rim board
 - 2. Trademark: Factory mark with APA trademark indicating thickness, grade, and compliance with APA standard.

2.5 PANEL PRODUCTS

- A. Wall Sheathing:

1. Plywood: Exterior, Structural I.
 2. Polyisocyanurate-Foam: ASTM C 1289, Type I, Class 2; with aluminum foil facings. Foam-plastic core and facings shall have flame spread of 25 or less, when tested individually.
- B. Roof Sheathing:
1. Plywood: Exterior, Structural I.
 - a. Sheet size: 4' x 8'
 - b. Thickness: 5/8"
- C. Combination Subfloor-Underlayment:
1. Plywood: DOC PS 1, Exposure 1, Structural I, Underlayment single-floor panels.
 2. Oriented Stand Board: Exposure 1 single-floor panels.
- D. Underlayment:
1. Plywood for Resilient Flooring: 3/8" thick, DOC PS 1, Exposure 1, Multi-ply Underlayment with fully sanded face.
 2. Plywood for Ceramic Tile: 3/8" thick, DOC PS 1, Exterior, C-C Plugged, 15.9 mm thick, for ceramic tile set in organic adhesive.
 3. Plywood for Carpet: 3/8" thick, DOC PS 1, Exposure 1 Underlayment.
- E. Telephone and Electrical Equipment Backing Panels: Plywood, Exposure 1, C-D Plugged, fire-retardant treated, not less than 19 mm thick.
- 2.6 MISCELLANEOUS PRODUCTS
- 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 except Type 304 stainless steel with treated lumber.
1. Power-Driven Fasteners: CABO NER-272.
 2. Bolts: Steel bolts complying with ASTM F 568, Property Class 4.6; with ASTM A 563M hex nuts and, where indicated, flat washers.
 3. Fire Retardant Materials: hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper fasteners with all pressure-preservative or fire-retardant treated wood products. The coating weight weights for zinc-coated fasteners shall be in accordance with ASTM A-153. Stainless steel fasteners shall be type 304 or 306.
- B. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.
1. Available Products:

a. Tyvek or approved equal.

C. Adhesives for Field Gluing Panels to Framing: APA AFG-01.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set 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 rough carpentry to substrates, complying with the following:
1. CABO NER-272 for power-driven fasteners.
 2. Published requirements of metal framing anchor manufacturer.
 3. Table 2305.2, "Fastening Schedule," in the BOCA National Building Code.
- C. Fastening Methods: Comply with recommendations and "Code Plus" provisions in APA Form No. E30K and the following:
1. Combination Subflooring-Underlayment: Glue and nail to framing.
 2. Subflooring: Glue and nail to framing.
 3. Sheathing: Nail to framing.
 4. Underlayment: Nail or screw to subflooring.

END OF SECTION 06100

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 – General Requirements is made a part of this section.
- B. Section 06158 - Over-deck-joist water diversion system.
- C. Submittals: Shop drawings, product data sheets and samples of all products being used. Submittal shall include a schedule of the size, type and species of wood being used for all finish carpentry products required.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- 1. Certified and stamped by the Forestry Stewardship Council.
- B. Lumber:
 - 1. DOC PS 20 and grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.
- C. Softwood Plywood: DOC PS 1.
- D. Hardwood Plywood: HPVA HP-1.

2.2 EXTERIOR FINISH CARPENTRY

- A. Exterior Finish Trim:
 - 1. AZEK[®] rigid poly-vinyl-chloride trimboards - www.azek.com
 - 2. Approved equal.
- B. Decking: Wood-polymer composite decking with 100% recycled content.
 - 1. AZEK Porch or approved equal: Used on all second floor decking. Tongue and groove, Vertigrain pattern. Color shall be selected by owner from manufacturer's standard color selections.
 - 2. TimberTech TwinFinish: Sizes in 4" and 6" widths based on installation. Color shall be selected by owner from manufacturer's standard color selections.
 - 3. Trex Accents: Sizes in 4" and 6" widths based on installation. Color shall be selected by owner from manufacturer's standard color selections.
 - 4. Approved equal.

2.3 INTERIOR STANDING AND RUNNING TRIM

- A. Interior Softwood Lumber Trim:
 - 1. C Select (Choice), eastern white, Idaho white, lodgepole, ponderosa, or sugar pine or Premium Grade white woods.
 - 2. MDO

- a. Door trim - match existing width, thickness and profile.
 - b. Window trim – match existing width, thickness and profile.
 - c. Base trim – match existing width, thickness and profile.
 - d. Wood floor quarter round molding – match existing width, thickness and profile.
- B. Wood Molding Patterns: Made to patterns in WMMPA WM 7 from kiln-dried stock graded under WMMPA WM 4.
1. Moldings for Painted Finish: P-Grade eastern white, Idaho white, lodgepole, ponderosa, or sugar pine.
 - a. Match existing profiles.

2.4 CLOSETS, SHELVING AND CLOTHES RODS

- A. Vertical Closet Partition: 1-inch Baltic Birch finish boards (width as specified).
- B. Shelving: 3/4-inch Baltic Birch finish boards as specified for interior softwood trim or MDO if approved by Owner.
- C. Clothes Rods: Steel 1-1/2". Provide intermediate supports as noted.

2.5 STAIRS AND RAILINGS

- A. Interior Treads: 1-1/16-inch, clear, kiln-dried, edge-glued, poplar stepping with half-round nosing unless otherwise noted.
- B. Interior Risers: 3/4-inch finish boards as specified for interior softwood trim unless otherwise noted.
- C. Interior Railings: Clear, kiln-dried, hard-maple or yellow-poplar railing stock unless otherwise noted.
- D. Exterior Treads: 1-1/4-inch TimberTech, Trex Origins™ or approved equal, unless otherwise noted.
- E. Exterior Risers: 3/4-inch AZEK® rigid poly-vinyl-chloride trim boards or approved equal, unless otherwise noted.
- F. Exterior Fascia Boards: 3/4-inch AZEK® rigid poly-vinyl-chloride trim boards or approved equal, unless otherwise noted.
- G. Classic contoured porch railing profile by Backyard America:
www.BACKYARDAMERICA.COM. Available through New England Construction Products
 1. Square composite pickets
 2. Traditional square balusters with ball cap
 - a. Reinforce composite railing system as required to ensure that lateral load requirements meet or exceed 300 pound static load. Provide structural engineer's stamp.
 - b. Provide metal handrails fastened to posts at 36" or 42" high in accordance with code requirements. Handrails shall be 1 1/2" diameter custom fabricated.

Fabrication shall be based upon field measurements of newly installed railing system. Reference specification section 05500.

H. Exterior Railings: Monarch Composite Deck & Railing System

1. Style: Bermuda™ Railing System.
 - a. Provide metal core in railing system.
2. Balusters: Traditional Square Balusters.
 - a. Reinforce composite railing system as required to ensure that lateral load requirements meet or exceed 300 pound static load. Provide structural engineer's stamp.
 - b. Provide metal handrails fastened to posts at 36" or 42" high in accordance with code requirements. Handrails shall be 1 ½" diameter custom fabricated. Fabrication shall be based upon field measurements of newly installed railing system. Reference specification section 05500.

I. Exterior Railings: Monarch Composite Deck & Railing System

1. Style: Chameleon™ Railing System.
 - a. Provide metal core in railing system.
2. Balusters: Traditional Square Balusters.
 - a. Reinforce composite railing system as required to ensure that lateral load requirements meet or exceed 300 pound static load. Provide structural engineer's stamp.
 - b. Provide metal handrails fastened to posts at 36" or 42" high in accordance with code requirements. Handrails shall be 1 ½" diameter custom fabricated. Fabrication shall be based upon field measurements of newly installed railing system. Reference specification section 05500.

2.6 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Stainless-steel for treated lumber and hot-dip galvanized steel nails elsewhere.
- B. Fasteners for Trex Decking: SplitStop™ — Star Drive Titan 3 Composite Screw, Dexxter™ Composite Screw, FastenMaster® TrapEase® II Composite Screw, or approved equal.
- C. Fasteners for Monarch Decking: 2 1/2" conventional decking screws in stainless or ceramic are recommended for porch decking installation.
- D. Fasteners for Azek Trim Boards: Stainless- steel trim head screws, 2 ¼" minimum lengths. Manufacturer's approved fillers over screw heads.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Condition finish carpentry in installation areas for 24 hours before installing.

- B. Prime and back prime lumber for painted finish exposed on the exterior.
- C. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Scribe and cut to fit adjoining work. Finger joints are acceptable. Refinish and seal cuts.
- D. Install standing and running trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Stagger joints in adjacent and related trim. Cope at returns and miter at corners.
- E. Select and arrange paneling for best match of adjacent units. Install with uniform tight joints.
- F. Install over-deck-joist water diversion system on all second floor or greater decks, reference Section 06158.

END OF SECTION 06200

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1: General Requirements is made a part of this section.
- B. 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.
- C. Quality Standard: Architectural Woodwork Institute's "Architectural Woodwork Quality Standards."
- D. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is completed, and HVAC system is operating.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.
- B. Particleboard: ANSI A208.1, Grade M-2.
- C. High-Pressure Decorative Laminate: NEMA LD 3.
 - 1. Products:
 - a. Student Occupancies: Kitchen Countertops and Full-Height Backsplash:
 - 1) Wilsonart; 4166-60 Pampas or color as specified by the Owner. Submit manufacturer's standard color samples for review and final selection.
 - 2) Nevamar. Submit manufacturer's standard color samples for review and final selection.
 - 3) Formica. Submit manufacturer's standard color samples for review and final selection.
 - b. Faculty/Staff Occupancies: See plan/scope of work for specific details.
- D. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
 - 1. Available Products:
 - a. Corian
 - b. Transolid
 - c. Sorel
 - d. Fountainhead
 - e. Approved equal.

2.2 INTERIOR WOODWORK

- A. Complete fabrication before shipping to Project site to maximum extent possible. Disassemble only as needed for shipping and installing. Where necessary for fitting at Project site, provide for scribing and trimming.
- B. Plastic-Laminate Countertops and Full-Height Backsplash: Premium grade.
 - 1. Laminate Grade: HGS for flat countertops, HGP for post-formed countertops.
 - 2. Grain Direction: Parallel to cabinet fronts.
 - 3. Edge Treatment: Same as laminate cladding on horizontal surfaces.
 - 4. Backsplash, 4" minimum.
- C. Solid-Surfacing Material Countertops: Premium grade.
 - 1. Fabricate tops in one piece with shop-applied backsplashes and edges.
 - 2. Solid-Surfacing Material Thickness: 1/2 inch.
 - 3. Integral sink bowls: ADA compliant bowl.
 - 4. Apron around perimeter of counter, width to meet ADA requirements, minimum 6".
 - 5. Backsplash, 4" minimum.
- D. Bathroom Cubbies
 - 1. High pressure laminate
 - 2. Transolid
 - 3. Phenolic
- E. Laminate Shelving; unless noted otherwise on drawings:
 - 1. Fabricate with Medium-Density Fiberboard: ANSI A208.2, Grade MD
 - 2. Cut cubbies / shelving sections to required sizes.
 - 3. Laminate all flat surfaces and all edges prior to assembling cubbies or installing shelving.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Island counter tops shall have steel frame.
- B. Exposed side of bar cabinets shall be treated with kitchen cabinet façade material. Coordinate with Owner in the field.
- C. Condition woodwork to prevailing conditions before installing.
- D. Install woodwork to comply with referenced quality standard for grade specified.
- E. Shop fabricated countertops. No field lamination.

- F. All outside corners to have a 5" radius.
- G. Minimize number of joints.
- H. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install to a tolerance of 1/8 inch in 96 inches for level and plumb.
- I. Provide 4" backsplash.
- J. Scribe and cut woodwork to fit adjoining work, seal cut surfaces, and repair damaged finish at cuts.
- K. Install trim with minimum number of joints possible, using full-length pieces to greatest extent possible. Stagger joints in adjacent and related members.
- L. Anchor countertops securely to base units. Seal space between backsplash and wall.

END OF SECTION 06402

SECTION 06900 – WOOD RESTORATION

PART 1 - GENERAL

1.1 - DESCRIPTION

A. Related Work Specified Elsewhere:

1. The General Conditions state that the Contract Documents are complementary, refer to Wesleyan Universities Major Maintenance General Requirements.
2. Temporary facilities and controls are specified in Division 1. Cooperate in ensuring adequate protection.
3. General material, equipment, and workmanship standards are specified in Division 1.
4. Paint is specified in Section 09900.

1.2 - DESCRIPTION OF WORK

- ##### **A. Restoring will include the use of epoxy consolidants, replacing portions of trim pieces, cutting out and providing dutchman.**

1.3 - REFERENCE STANDARD

- ##### **A. The Secretary of the Interiors “Standards for Rehabilitation” will be used as a reference standard.**

1.4 - QUALITY ASSURANCE

A. Qualifications:

1. Carpenters/woodworkers: Work must be performed by firms and individuals having not less than five years successful experience in comparable wood restoration projects and employing personnel skilled in the restoration processes and operations indicated.
- ##### **B. Source of materials: Obtain the materials specified in this section from sources or vendors who are thoroughly familiar with the use and quality of their products.**
- ##### **C. Regulatory requirements: Manufacturer’s materials and products specified in this section must certify that they meet or exceed all applicable regulatory and safety rules and guidelines for handling and using their materials and products.**

1.5 - SUBMITTALS

- ##### **A. Submittals Requirements and Procedures are specified in Division 1.**
- ##### **B. Submit documentation from the suppliers as to the origin of the specific wood, species and moisture content. Wood found not to be suitable because of general appearance, quality, species or improper moisture content will be rejected.**

- C. Submit manufacturer's data, specifications, and instructions for use and handling for all epoxy products and total wood protection products.

1.6 - ENVIRONMENTAL CONDITIONS

- A. Do not remove exterior elements of structures when rain is forecasted or in progress. Cover and protect all exposed elements of the structure on a routine basis to prevent direct contact with excessive moisture.
- B. Follow manufacturer's instructions for precautions and effects of products and procedures on adjacent building materials, components and surrounding vegetation and soil.

1.7 - DELIVERY AND HANDLING

- A. Deliver materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturers.
- B. Handle materials in accordance with manufacturer's recommendations and safety guidelines.

1.8 - STORAGE AND PROTECTION

- A. Every effort must be made to use and reuse materials that are original to the structure. When removed from their rightful place, these materials must be stored under cover inside the building where they cannot be damaged.
- B. If many pieces are to be removed, they must be marked inconspicuously in a consistent manner as to their original location.
- C. New material must be kept dry during delivery, storage and handling. Do not allow them to be stored in contact with damp surfaces.

PART 2 - PRODUCTS

2.1 - MATERIALS

- A. Non-structural framing:
 - 1. Native, seasoned (19% moisture content max.) wood to match and replicate existing members in size and shape. If existing wood species cannot be matched, use mahogany if existing is a hardwood and clear cedar if existing is a softwood.
- B. Epoxy:
 - 1. Epoxy materials of a type recommended for use in the restoration of wood products.
 - a. Epoxy consolidant.
 - b. Epoxy adhesive.

c. Epoxy filler or patching material for general use.

2. Approved manufacturers:

a. Conservation Services

7 Goodale Road
Newton, NJ 07860
(973) 579-1112

Manufacturer for ConServ Flexible Epoxy Consolidant 100, Flexible Epoxy Patch 200, Epoxy Adhesive 500 and Structural Epoxy 600.

b. Abatron

5501-95th Avenue
Kenosha, WI 53144
(800) 445-1754

Manufacturers of Liquidwood - 1 (Consolidant). Woodepox - 2 (Adhesive paste).

c. West System

102 Patterson Ave.
P.O. Box 665
Bay City, MI 48707-0665
(866)-937-8797 / 989-684-7286 / Fax 989-684-1374

Manufacturers of West System 105 epoxy resin, 205 fast hardener, 404 High Density gap filler, 407 Low Density surface filler, and Six 10 epoxy adhesive.

d. Other manufacturer's may be submitted for review and approval.

C. Plywood: APA Marine - A-A-EXT-APA-000-PS1-83, ¾" thick. Provide high-density overlay face to exposed inside of cabinets.

PART 3 - EXECUTION

3.1 - PREPARATION

A. Take care to minimize any damage to the entire structure, inside and out. If pieces and parts must be removed on a temporary basis, remove such pieces in such a way so that they can be put back in place with minimum visual impact.

B. Historic structure precautions:

1. No smoking is allowed by all personnel around historic structures.

2. If historic materials cannot be saved, the replacement piece must be an accurate duplicate of the original and installed using the exact manner as the original. If the original manner of installation is unknown, follow recognized standards.

3. All materials that are removed should be inconspicuously marked with the date and a symbol designating repair or maintenance.
4. Concealed carpentry need to duplicate the concealed historic material but must be of similar thickness to provide equivalent support, durability, and strength. If the historic work has a unique feature in the concealed carpentry, duplicate it.

C. Protection:

1. Protect all adjacent surfaces from spills with plastic sheeting. If any epoxy happens to spill, wipe it up immediately before it sets or it will not come up.
2. All workers must be protected from the effects of dusts and chemicals during the cleaning operations. The supervisor should ensure that all workers wear adequate, approved protective clothing and are provided with protective equipment during these operations and as required at other times.
3. Provide masking or covering on adjacent surfaces and permanent equipment. Secure coverings without the use of adhesive type tape or nails. Impervious sheeting which produces condensation should not be used.

D. Surface preparation for epoxy:

1. Dry affected wood member completely. Be prepared to use several means and methods and time to dry out wood members. If this precaution is not taken, the epoxy can actually trap moisture in wood fibers and accelerate the decay process.
2. Organization and cleanliness are keys to proper epoxy repair. Have all materials at hand before the mixing process begins.

3.2 - ERECTION, INSTALLATION, APPLICATION

A. Execute non-structural and finish carpentry according to established good practice.

1. Anchor work firmly to structure.
2. Use adhesive as well as fasteners whenever possible and when appropriate.
3. Replicate existing joinery details where appropriate.
4. Blind miter exterior joints.
5. Use non-corrosive fasteners - see Section 01600.
6. Set nails for puttying.
7. Contractor is at liberty to introduce other means and methods to accomplish any and all tasks but must first present such other means and methods to the Architect and Owner for approval before execution. All means and methods must comply with the "Standards for Rehabilitation".

- B. Fabrication and replacement “Dutchmen” may be done in a woodshop or on-site. Remove original wood piece or component from structure and use as guide for replication. Fasten “Dutchmen” to original architectural component using non-corrosive fasteners, epoxy adhesives, dowels, or a combination of methods and or other approved methods.
- C. Generally use epoxy materials as follows:
1. Drill ¼” or 3/16” holes in affected wood to receive epoxy consolidant. Holes should be drilled at an angle and spaced approximately 2” on center in staggered rows. The top of one hole should line up with the bottom of the next hole. Be sure not to drill through the entire surface for consolidant will leak out from behind. Dam any surface cracks with oil clay so that epoxy will not leak.
 2. Following manufacturer’s instructions, carefully squirt the consolidant into the pre-drilled holes. The aim is to completely saturate the wood. Move from hole to hole refilling until the wood can hold no more. More than one application may be needed.
 3. If severed pieces need to be re-attached, glue them in place with a mixture of consolidant and filler.
 4. After the consolidant has cured, fill the voids in the surface with epoxy filler. If the voids are large, apply filler in succession, 1” of depth at a time. This cuts down on the possibility of problems associated with heat build-up.
 5. Mix the two part epoxy filler similar to the consolidant. When mixed, the filler should have the consistency of a glazing compound that can be worked with a putty knife. Apply the filler to the surface. Build up filler layers slightly above the wood surface to allow for planing and sanding smooth after it has cured.
 6. Fill gaps in mitered joints, and deep checks in wood with epoxy gap fillers/adhesives.
 7. Fill surface gouges, or build up trim profiles using a low density epoxy filler to allow for sanding and shaping.
- D. It is recognized that wood repair, restoration and epoxy work cannot be accomplished without first removing the existing paint finishes. Coordinate with other trades (painters) and cooperate with the necessary procedures of restoration to achieve successful restoration.

END OF SECTION 06900

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data, schedule outlining location, area and type of insulation being installed
- C. 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. Smoke-Developed Index: 450 or less.

PART 2 - PRODUCTS

2.1 INSULATION PRODUCTS

- A. Cellulosic-Fiber Loose-Fill Insulation: ASTM C 739; chemically treated for flame-resistance, processing, and handling characteristics.
- B. Natural Cotton Fiber Insulation: ASTM E-84, UL-723; ASTM C 739; Ultra Touch natural cotton fiber building insulation with flame spread 5 (Class 1) as manufactured by Bonded Logic, Inc.
- C. SafeTouch Fiberglass-Free Insulation: thermo-acoustic quilt manufactured from polyester fibers.
- D. Self-Supported, Spray-Applied, Cellulosic Insulation: ASTM C 1149, wood-based cellulosic fiber, Type II, applied with dry adhesive activated by water during installation); chemically treated for flame-resistance, processing, and handling characteristics.
- E. Foam-in-place Insulation: Self-expanding foam Icynene with no CFC content.
- F. Thermafiber SAFB Acoustical Fire Batts: Mineral wool fiber insulation. CFC and HCFC free product and process. Made from natural and recycled materials by U.S.G. No substitutions for CFA A HVAC Replacement.
- G. Board Insulation: Foam board insulation under vinyl siding, 1" thickness.

2.2 ACCESSORIES

- A. Vapor Retarder: Reinforced polyethylene, 8 mils thick.
- B. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed to fit between roof framing members and to provide cross-ventilation between attic spaces and vented eaves.
- C. Attic Hatch Weather Stripping: Self-adhesive foam weatherstrip tape or approved equal as required based on differing attic hatch conditions.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Install insulation in areas and in thicknesses indicated or required to produce R-values indicated. Install foam and place insulation tightly around obstructions and fill voids.
- B. Place loose-fill insulation to comply with ASTM C 1015.
 - 1. Comply with the Cellulose Insulation Manufacturers Association's Special Report #3, "Standard Practice for Installing Cellulose Insulation."
- C. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage. Locate seams at framing members, overlap, and seal with tape.
- D. Acoustical fire batts: provide thicknesses to meet required acoustical performance.

3.2 ATTIC AREA INSTALLATION

- A. All open joisted areas shall be blown with class 1 cellulose blown-in insulation, R-60 minimum.
- B. All floorboard attic areas shall be insulated with Class 1 cellulose blown-in insulation below floorboards to prevent heat loss and air infiltration, R-38 minimum and provide batt insulation on top of floor boards for a total R-value of 60.
- C. Attic area floorboards shall be removed as required to fill the cavity below with blown cellulose. Floorboards shall be re-installed with screws upon completion of the work.
- D. All floorboard attic areas shall have cotton batt insulation installed on top of floorboards, for a total R-value of 60.
- E. All attic hatches, kneewall doors and entrances shall be covered with R-38 cotton batting over and around the opening area. Securely fasten batting to attic hatches, kneewall doors and entrances as required.
- F. Install self adhesive foam weatherstripping tape or approved weatherstripping style required to accommodate the various opening field conditions. Install weatherstripping around the perimeter of all attic hatch openings, kneewall doors and walk-up door entrances.
- G. All sprinkler pipes shall be wrapped with foil-backed duct wrap insulation, in order to capture heat from conditioned space as well as insulate from unheated space.
- H. All kneewalls shall be insulated with R-38 cotton batting, stapled in place.
- I. Avoid disturbing existing insulation - especially loose-fill. Moving it around can create gaps where air can leak through.
- J. When adding batts or blankets, install them at right angles to the first layer.

3.3 EXTERIOR WALL INSTALLATION

- A. Remove two rows of siding high and low around the perimeter of each house, two rows per floor (excluding attic area walls).

WESLEYAN UNIVERSITY

- B. Drill two holes per bay (one high and low) on each bay center as required for insulating.
- C. Furnish and install class 1 cellulose.
- D. Plug holes with insulated foam plugs.
- E. Reinstall siding with #6 galvanized nails for clapboard, galvanized shake nails for asbestos and cedar shakes or galvanized 1 ½" nails for aluminum and vinyl.
- F. Caulk siding as required, clean up insulation debris and remove from site. Rake ground of wood chips and insulation, sweep steps and walks.
- G. All work areas shall be flagged with caution tape or barricaded as required to maintain a safe work site.

END OF SECTION 07210

SECTION 07311 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements are made a part of this section.
- B. Submittals: Product Data and Samples.
- C. Identify each bundle of shingles with appropriate markings of UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A.
 - 2. Wind-Resistance-Test Characteristics: ASTM D 3161 or UL 997, passed.
- D. Warranties: Provide standard manufacturer's written warranty, signed by manufacturer agreeing to promptly repair or replace asphalt shingles that fail in materials or workmanship within 30 years from date of Substantial Completion, prorated, with first 5 years non-prorated. Provide transferrable warranty times one.

PART 2 - PRODUCTS

2.1 ASPHALT SHINGLES

- A. Fiberglass Shingles: Architectural shingles complying with ASTM specifications E 108 Class A or UL 790 Class A, D 3462, D3161 or UL 997, D3018 Type I, ASTM D228.
- B. Available Products:
 - 1. Owens Corning; Duration Shingles with SureNail Technology
 - a. 30 Year Limited Warranty
 - b. Algae Resistance Limited Warranty
 - c. Wind Resistance 110 mph
 - 2. Timberline Cool Series
 - a. Fiberglass Asphalt Construction
 - b. Lifetime Ltd. Warranty
 - c. 10 Yr. Smart Choice® Protection
 - d. 130 mph Ltd. Wind Warranty**
 - e. Listed Class A fire—UL 790
 - f. ASTM D3161 Type 1, Class F
 - g. ASTM D3018 Type 1
 - h. ASTM D3462***
 - i. CSA 123.5-98
 - j. Approx. 64 Pieces/Sq.\
 - k. Approx. 4 Bundles/Sq.
 - l. Approx. 256 Nails/

3. Flat tab shingles as may be identified in specific scope drawings based on existing conditions.

2.2 ACCESSORIES

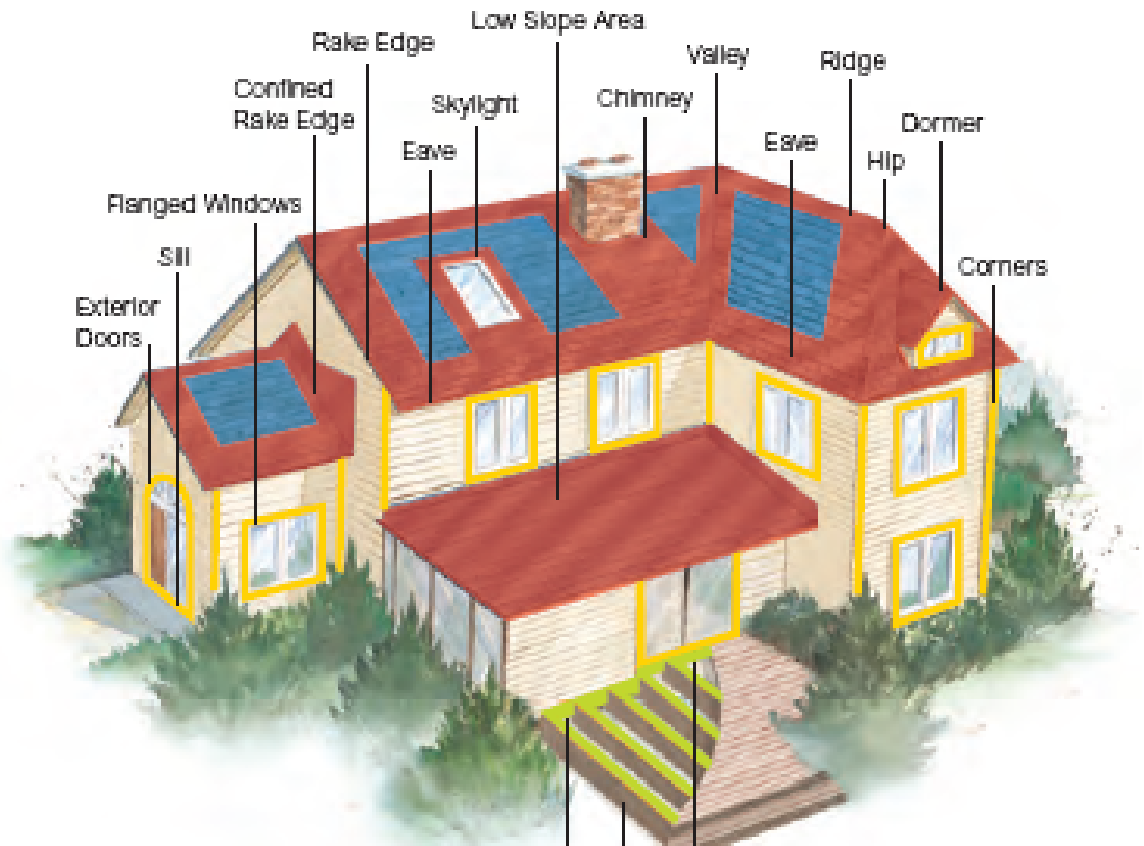
- A. Felts: ASTM D 226, Type I, asphalt-saturated organic felts.
- B. Self-Adhering Sheet Underlayment (Ice and Water): ASTM D 1970, SBS-modified asphalt; mineral-granule or slip-resisting-polyethylene surfaced; with release paper backing; cold applied.
- C. Ridge Vent: Rigid UV-stabilized plastic ridge vent with nonwoven geotextile filter strips with external deflector baffles; for use under ridge shingles.
- D. Valley Flashing: 'W' Valley Metal
- E. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- F. Roofing Nails: Aluminum, stainless-steel, or hot-dip galvanized steel shingle nails, minimum **0.120-inch** diameter, of sufficient length to penetrate **3/4 inch** into solid wood decking or extend at least **1/8 inch** through OSB or plywood sheathing.
- G. Sheet Metal Flashing and Trim: Comply with requirements in Division 7 Section "Manufactured Roof Specialties"
 1. Sheet Metal: Aluminum with baked enamel finish where exposed.
 2. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual."
 3. Drip Edge: Pre-formed sheet metal with at least a **3-inch** roof deck flange and a **1-1/2-inch** fascia flange with a **3/8-inch** drip at lower edge.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Protect all exterior elevations of building from damage or staining. Contractor to provide tarps in sufficient sizes.
- B. Comply with recommendations in ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- C. Apply ice and water self-adhering sheet underlayment at eaves and rakes from edges of roof to at least **36 inches** inside exterior wall line including confined rake edges, low slope areas, ridge, hip, dormers, chimneys, skylights, roof hatches. See detail below (H.).
- D. Apply ice and water self-adhering sheet underlayment at valleys extending **18 inches** on each side.
- E. Install W metal valleys complying with ARMA and NRCA instructions. Rolled roofing is not acceptable in valleys.

- F. Install metal flashings and other sheet metal to comply with requirements in Division 7 Section " Manufactured Roof Specialties," recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- G. Install drip edge on top of ice and water in all locations.
- H. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- I. Contractor shall meet or exceed all fall protection requirements as specified in the project manual. Failure to do so will result in contract termination.
- H. Required Ice and Water installation locations.



END OF SECTION 07311

SECTION 07460 – VINYL SIDING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements are made a part of this section.
- B. Submittals: Product Data and Samples.
 - 1. Product Data, schedule and shop drawings outlining building elevations, type, size and details of siding to be installed. All details **must** match the existing siding and trim profile details with no exception. Custom trim/siding details may be required based upon the existing house details.
 - 2. Contractor shall photograph and document all existing siding details for each house. All documentation shall be submitted to the Owner for record. Documentation shall include but not be limited to all exterior trim details, window trim details, soffit details, watertable details, porch and railing details, decorative half-round siding details, attic louver details, shutter details, siding details, etc.
 - 3. Contractor shall submit shop drawings for each house along with product cut sheets and samples to the Owner for review and approval. All siding and trim details must match the existing. No materials shall be ordered until reviewed and approved by the Owner
 - 4. Submit research/evaluation reports from a model code organization acceptable to authorities having jurisdiction.
- C. Warranties: Manufacturer's standard from in which siding manufacturer agrees to repair or replace siding that fails in materials or workmanship within 20 years. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering.

PART 2 - PRODUCTS

2.1 SIDING

- A. Vinyl Siding: ASTM specification for Rigid Polyvinyl Chloride (PVC) Siding D 3679, the ASTM specification for Rigid, Cellular Polystyrene Thermal Insulation C 578, and the requirements of sections 1404.9 and 2603 of the International Building Code.
- B. Products:
 - 1. CertainTeed CedarBoards Insulated Siding or approved equal to match existing siding and trim details. (Custom details may be required).
 - a. 044" thickness.
 - b. Straight even face with flat surface for look of wide board wood siding.
 - c. Custom contoured foam to provide strength and rigidity for outstanding impact resistance.
 - d. Energy Star rated.

- e. 60% recycled content.
 - f. TrueTexture™ rough cedar finish molded from real cedar boards.
 - g. Patented STUDfinder™ designed for accurate and secure installation.
 - h. Sound Absorption for reduced exterior noise infiltration.
 - i. DuraLock® post-formed lock design.
 - j. 3/4" panel projection.
 - k. Lifetime limited warranty.
 - l. Color: Submit manufactures standard colors for Owner review and final color selection.
 - m. Exposure: Double 4" clapboard **unless otherwise noted**.
2. CertainTeed Monogram 46 and/or 46L Classic Style Siding or approved equal to match existing:
- a. Heavy-Duty .046" thickness.
 - b. TrueTexture™ rough cedar finish molded from real cedar boards.
 - c. Patented STUDfinder™ designed for accurate and secure installation.
 - d. RigidForm™ 220 Technology tested to withstand wind load pressures up to 220 mph.
 - e. CertiLock™ self-aligning, post-formed positive lock system.
 - f. 3/4" panel projection.
 - g. Maintenance free material.
 - h. Class 1(A) fire rating.
 - i. Lifetime limited warranty.
 - j. Works with Monogram® 46L longer length siding.
 - k. Color: Submit manufactures standard colors for Owner review and final color selection.
 - l. Exposure: Double 4" clapboard **unless otherwise noted**.
3. CertainTeed Cedar Impressions Perfection Shingles or approved equal to match existing:
- a. Patented PanelThermometer™ for precise installation.

- b. TrueTexture™ finish.
- c. Designed and tested to withstand hurricane force winds.
- d. Made of injection molded, durable polymer.
- e. 3/4" Panel Projection.
- f. .100" Thick.
- g. Molded Perimeter Lock™ to create a virtually seamless appearance.
- h. Maintenance free material.
- i. Lifetime limited warranty.
- j. Color: Submit manufactures standard colors for Owner review and final color selection.
- k. Exposure: Double 7" straight Edge **unless otherwise noted**.

2.2 SOFFIT

- A. Vinyl Soffit: ASTM D 4477, integrally colored.
- B. Products:
 - 1. CertainTeed Soffit or approved equal (To be selected to match existing soffit details):
 - a. Beaded Triple 2:
 - b. Triple 3; 1/2" Invisivent
 - c. Ironmax Double 5"
 - d. Universal Triple 4"
 - 2. Provide siding manufacturer's standard products as required to maintain siding system warranty (Soffit must match existing details – Review with Owner).
 - 3. Pattern: As selected from manufacturer's full range. (Soffit must match existing details – Review with Owner).
 - 4. Ventilation: Provide unperforated soffit, unless otherwise indicated. (Soffit must match existing details – Review with Owner).

2.3 TRIM & DECORATIVE DETAILS

- A. Products:
 - 1. Certainteed Restoration Millwork, Azek or approved equal:

- a. Provide siding manufacturers trim pieces for all gable, accent, corner, window and door details. Custom fabricate break metal as required for all existing wood trim that cannot be covered with manufacturers standard trim pieces. Coordinate all details with Owner prior to the start of work.

2.4 SPECIALTY SHAPES

A. Products:

1. Mid-America Siding Components or approved equal:

- a. Provide specialty shapes to match existing shapes as closely as possible. Specialty shapes shall be selected from the manufacture's six classic shapes as follows.

- 1) Hexagon
- 2) Mitered Corner
- 3) Fish Scale
- 4) Octagon
- 5) Half Cove
- 6) Round

Shapes selection shall be project specific and reviewed with the Owner to match existing shapes as close as possible.

- b. Color: Submit manufactures standard colors for Owner review and final color selection.

2.5 SPECIALTY VENTS

A. Products:

1. American Louver and Vent Company (www.alvcompany.com) or approved equal:

- a. Provide specialty gable vents to be installed at locations specified or to match existing vents removed. Review vent selection options with Owner for each specific project.
- b. Provide foundation / crawlspace vents at locations specified.
- c. Color: Submit manufactures standard colors for Owner review and final color selection.

2.6 INSULATION

- A. Rigid Foam Insulation. 1" FOAMULAR insulating sheathing or ½" FOAMULAR insulating sheathing, as noted on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Prior to the start of installation, contractor shall schedule a meeting with the Owner to review approved shop drawing details and all University construction standards and safety requirements.
- B. Contractor shall install FOAMULAR insulating sheathing over all exterior walls to create an insulating envelope over the entire structure prior to installing siding. Thickness shall be ½” or 1” as noted on the drawings.
- C. Contractor shall Install vinyl siding, soffit, and all accessories in accordance with the manufacturers installation manual and ASTM D 4756 requirements.
- D. Contractor shall meet or exceed all fall protection requirements as specified in the project manual. Failure to do so will result in contract termination.

END OF SECTION 07460

SECTION 07531 - EPDM MEMBRANE ROOFING

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS

- A. Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Design Uplift and Factored Design Uplift Pressure shall be per SPRI's "Wind load design guide for Fully Adhered and Mechanically Fastened Roofing Systems" after multiplication by a safety factor.
 - 1. Material Compatibility: Provide roofing materials that are compatible with one another under the conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
 - 2. FMG listing: All materials to comply with FMG 4450, 4470. Identify such with FMG markings, class 1 noncombustible construction.
 - 3. Fire/Windstorm Classification: 1A-90.
 - 4. Hail Resistance: MH
 - 5. Complete 30-plus year NDL manufacturer's warranty, three inspections with full reports at 6 month intervals.
 - 6. System design shall comply with Connecticut State Building Code for corner, perimeter, and field of roof uplift pressure.
 - 7. System design shall comply with Connecticut State Building Code for insulation R value.
- C. All materials provided shall be asbestos-free.

1.2 SUBMITTALS

- A. Product data: For each type of product indicated.
- B. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system. Contractor and each individual working on installation of new roof must be certified.
- C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with the requirements specified in "Performance Requirements."
 - 1. Submit evidence of meeting performance requirements.
- D. Shop drawings: For roofing system. Include plans, sections, elevations, details, and attachments to other work.
 - 1. Termination bar / counter flashing reglet detail at parapet walls.
 - 2. Base flashing, cants and membrane terminations.
 - 3. Tapered insulation, including slopes.
 - 4. Crickets, saddles, and tapered edge strips, including slopes.

5. Fastening details for all materials.

C. Samples:

1. 12 x 12 – inch square of EPDM ply sheet
2. 12 x 12 – inch square roofing with seam
3. 12 x 12 – inch square flashing sheet (all types)
4. 12 x 12 – inch square of roof insulation
5. 12 x 12 – inch square of walkway pad
6. All fastener types
7. Termination bars, counter-flashing, anchors, laps, joinery, etc

D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

1. Indicate that bulk roofing asphalt materials delivered to Project comply with requirements. Include quantity and statistical and descriptive data for each product. Submit certificate with each load before it is used.
2. Include continuous log showing time and temperature for each load of bulk asphalt, indicating date obtained from manufacturer, where held, and how transported before final heating and application on roof.

E. Maintenance Data: For roofing system to include maintenance manuals.

F. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

G. Warranties:

1. Manufacturer's standard form, without monetary limitation for all components, signed by roofing manufacturer agreeing to repair leaks due to defects in materials or workmanship for a period of 30 years from the date of substantial completion.
2. Roofing installer's warranty: Full warranty with out monetary limitation for all components, 2 years from substantial completion. Warranty to include all roofing materials, metals, sealants, etc.

H. Substrate shall be signed off by manufacturer and certified installer prior to installing membrane. Substrate shall be inspected by roofing installer and manufacturer prior to the application of any new roofing products.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty. Provide documentation to Owner.

B. Source Limitations: Obtain components for roofing system approved by roofing system manufacturer.

C. All products shall be protected from the weather. Wet insulation board will not be accepted.

- D. Pre-Installation Conference: Prior to the start of work, all methods and procedures relating to the roofing system shall be reviewed to include, but not be limited to the following:
1. Meet with Owner, testing and inspection agency (if applicable), roofing installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. All manufacturers' details applicable to the conditions of the respective roof shall be submitted for review. All unique details shall be reviewed during this conference.
 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
 5. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 6. Review structural loading limitations of roof deck prior to use of any machinery on the roof.
 7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.
- E. Substrate shall be signed off by manufacturer and certified installer prior to installing membrane.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.
- B. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location, provide storage container if necessary, wet insulation will not be permitted on roof. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- C. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.5 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Contractor to submit detailed mobilization plan for each roof location including but not limited to – material load/unload, material staging, equipment staging/parking, crane set up, restroom facilities, employee parking.

PART 2 - PRODUCTS

2.1 ROOFING MATERIALS

- A. EPDM Sheet: ASTM D 4637, 90 mils thick; Color shall be White.
 - 1. Products:
 - a. Firestone
 - b. Carlisle SynTec
 - c. Johns Manville
 - d. Sarnafil
 - e. Tremco
 - f. Garland
- B. Auxiliary Materials: Recommended by roofing system manufacturer for intended use and as follows:
 - 1. Sheet Flashing: EPDM thickness shall be as required to comply with 90 mil EPDM system requirements to satisfy warranty conditions.
 - 2. Seaming Material: Synthetic-rubber-polymer primer and 3-inch- wide minimum, butyl splice tape with release film or as specified in accordance with manufacturer system requirements.
 - 3. Curb Flashing: Flashing required for roof curbs per manufacturers recommendation to maintain warranty.
 - 4. Corner Flashing: Flashing for inside and outside corners per manufacturer's recommendation to maintain warranty.
 - 5. Pipe Flashing: Pre-molded pipe / conduit flashing required for round penetrations per manufacturers recommendation to maintain warranty.
- C. Cover Board: ASTM C208, Type II, Grade 2 cellulositic-fiber insulation board. ASTM C 1177, Type X, glass-mat, water-resistant gypsum substrate; 1/2 inch thick.
- D. Walkway Pads: 30"x 30" x .300 thick slip resistant rubber polymer.

2.2 ROOF INSULATION

- A. Cant Strip: Non-flammable perlite cants with 45° face slope and minimum 5" face dimension or as recommended by the roofing manufacturer.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II.
- C. Fabricate tapered insulation with slope of 1/4 inch per 12 inches, unless otherwise indicated. Submit complete tapered insulation plan for approval.
- D. Insulation Accessories: Corrosion resistance FM4470

2.3 ASPHALT MATERIALS (if applicable)

- A. Asphalt for insulation and EPDM roofing: ASTM D312, Type III or IV

- B. Asphalt Primer: ASTM D-41

PART 3 - EXECUTION

3.1 EXAMINATION

- A. During the bid process and prior to the start of work, contractor shall examine all existing field conditions to incorporate all work required for a complete installation for each building noted.
- B. Verify that substrate is visibly dry and free from moisture. Test for moisture in accordance with manufacturer's installation requirements.
- C. Substrate shall be signed off by manufacturer and certified installer prior to installing membrane.

3.2 INSTALLATION

- A. Protect all exterior elevations of building from damage or staining. Contractor to provide tarps in sufficient sizes.
- B. Clean substrate of dust, debris, moisture and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove all sharp projections.
- C. Prior to the start of new work, manufacturer's representative shall review and inspect the existing deck prior to installing the insulation. Manufacturer's representative shall also review and inspect the entire system throughout the installation process, to include but not be limited to the tapered insulation, coverboard, EPDM membrane, flashing at all penetrations, curbs, corners, counter flashing, and all other roofing system components.
- D. No insulation shall be left exposed at the end of a work day, both on the roof and on the ground. All insulation to stay covered at all times.
- E. Stagger joints between rows of insulation; fill all gaps in excess of 1/4". Cut all insulation within 1/4" of all terminations, nailers, projections etc.
- F. Adhere insulation to wood deck in accordance with manufacturer's requirements.
- G. Adhere cover board to tapered insulation in accordance with manufacturer's requirements. Required installation layout pattern shall comply with manufacturer requirements.
- H. Install EPDM sheets in accordance with roofing system manufacturer's written instructions and as follows:
 - 1. Adhered Roofing Membrane Installation:
 - a. Install in strict accordance with manufacturers written instructions.
 - b. Installation shall not commence without the presence of the manufacturer's technical personnel.
 - c. Bonding adhesive shall be applied at rate required by roofing manufacturer.

- d. Apply roofing membrane with side laps shingled with slope of roof deck, plan layout accordingly.
- I. Seams: Clean and prime splices areas, applying splice tape, and firmly roll side and end laps of overlapping sheets. Seal exposed edges of sheet terminations.
- J. Install sheet flashings and preformed flashing accessories and adhere to substrates. Protect roofing from damage and wear during remainder of construction period.
- K. Walkway pads shall be installed at all access points (ladders, hatches, doorways, etc.) to the roof. Pads shall also be installed around all mechanical equipment which will require maintenance. Installation spacing shall comply with manufacturer requirements.
- L. Correct deficiencies in or remove and reinstall roofing and sheet flashing that does not comply with requirements.

END OF SECTION 07531

SECTION 07710 - MANUFACTURED ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1- General Requirements are made a part of this section.
- B. Submittals: Product Data, Shop Drawings, and color Samples.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Copper Sheet: ASTM B 370, Temper H00 or H01, cold rolled, mill finished; as approved by Owner.
- B. Aluminum Sheet: ASTM B 209, alloy and temper as recommended by manufacturer for use intended and finish indicated.
- C. Aluminum Extrusions: ASTM B 221, alloy and temper as recommended by manufacturer for use intended and finish indicated.
- D. Aluminum Finish: Complying with AAMA 611 Class I, color anodic finish. Coordinate finish requirements with Owner based upon specific project requirements.
- E. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, No. 2B (bright, reflective), 3 (directional satin), 4 (fine directional satin) finish. Final finish shall be as directed by the Owner.
- F. Prepainted, Zinc-Coated Steel Sheet: ASTM A 653/A 653M, G90 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. Products: To meet or exceed the following:
 - a. Copper: 20 oz./sq. ft..
 - b. Aluminum: 0.080 inch thick.
 - c. Prepainted, Zinc-Coated Steel: 0.034 inch thick.

- C. Fascia: Manufactured, two-piece fascia consisting of metal fascia cover and a continuous galvanized steel cant dam with integral drip-edge cleat to engage fascia cover. Provide mitered and welded corner units. Fabricate from exposed metal indicated below.
1. Products: To meet or exceed the following:
 - a. Aluminum: 0.080 inch thick.
 - b. Prepainted, Zinc-Coated Steel: 0.034 inch thick.
- D. 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. Products: To meet or exceed the following:
 - a. Copper: 16 oz./sq. ft..
 - b. Aluminum: 0.050 inch thick.
 - c. Stainless Steel: 0.0250 inch thick.
 - d. Prepainted, Zinc-Coated Steel: 0.034 inch thick.
- E. Gutters, Gutter Guards and Downspouts:
1. Gutters: To meet or exceed the following - Manufactured formed gutter, with mitered and welded or soldered corner units, end caps, outlet tubes, and other accessories. Elevate back edge at least 1 inch above front gutter rim. Based on specific site conditions, furnish with gutter brackets or flat-stock gutter straps and gutter support brackets and expansion joints and expansion-joint covers fabricated from same metal as gutters. Fabricate from exposed metal indicated below. Coordinate with Owner type of securing hardware to be used at each location.
 - a. Gutter Style: Rectangular, Half round or Ogee – Coordinate with Owner based on existing conditions.
 - b. Aluminum: 0.032 inch thick.
 - c. Prepainted, Zinc-Coated Steel: 0.034 inch thick.
 - d. Copper: 20 oz./sq. ft..
 2. Gutter Guards: Continuous cover that allows water to flow freely while debris is lifted away from gutters with a slight breeze. Independent testing shall be submitted showing that the system being provided is 100% effective against leaves, twigs, pine needles and small debris. Gutter guard shall also be completely weather & pest resistant, fit all standard gutters, and shall never clog and or overflow.
 3. Downspouts: Rectangular closed-face with mitered elbows, manufactured from the following exposed metal. Furnish wall brackets of same material and finish as downspouts, with anchors. All downspouts tied in to storm system shall have cleanouts with covers.

- a. Formed Aluminum: 0.032 inch thick.
- b. Extruded Aluminum: 0.032 inch thick.
- c. Prepainted, Zinc-Coated Steel: 0.034 inch thick.
- d. Copper: 16 oz./sq. ft..

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.
- D. **Furnish and install cleanouts at all downspout locations that tie into existing underground drainage pipe.** Connect all downspouts to cleanouts.
- E. **Furnish and install downspout extensions and splash blocks at all locations where gutter downspouts are not tied into underground drainage.**

END OF SECTION 07710

SECTION 07841 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 – General Requirements is made a part of this section.
- B. Submittals: Product Data and product certificates signed by manufacturer certifying that products furnished comply with requirements.
- C. Provide firestopping systems with fire-resistance ratings indicated by reference to UL designations as listed in its "Fire Resistance Directory," or to designations of another testing agency acceptable to authorities having jurisdiction.
- D. Provide through-penetration firestopping systems with F-ratings indicated, as determined according to ASTM E 814, but not less than fire-resistance rating of construction penetrated.
 - 1. Provide through-penetration firestopping systems with T-ratings as well as F-ratings, as determined according to ASTM E 814, where indicated.
- E. For exposed firestopping, provide products with flame-spread indexes of less than 25 and smoke-developed indexes of less than 450, as determined according to ASTM E 84.

PART 2 - PRODUCTS

2.1 FIRESTOP SYSTEMS

- A. Any through-penetration firestop system that is classified by UL or listed by ITS for the application and with F-rating and T-rating indicated may be used.
- B. UL-classified systems shall be submitted for the following:
- C. Firestop Systems with No Penetrating Items
- D. Firestop Systems for Metallic Pipes, Tubing, or Conduit
- E. Firestop Systems Nonmetallic Pipes, Tubing, or Conduit
- F. Firestop Systems Insulated Pipes
- G. Firestop Systems for Electrical Cables
- H. Firestop Systems for Air Ducts

2.2 MATERIALS

- A. Fire Barrier Devices: Factory-assembled devices formed from galvanized steel and lined with intumescent material sized to fit specific opening in the substrate.

2.3 MANUFACTURED UNITS

- A. Where scheduled, provide the following UL classified fire barrier device. Device consists of a metal enclosure with intumescent materials, factory-painted red, foam inserts, and mounting brackets, in the size(s) appropriate for the installation.
- B. Metal Enclosure: 0.0276 inch zintec-coated steel.
 - 1. Enclosure Finish: Manufacturer's standard powder coating of lead-free epoxy-polyester.
- C. Foam Inserts: Flexible polyurethane, Class O Non-Flammable foam treated with water-based latex, properly sized by device manufacturer base on size of device.
- D. Mounting Brackets: 0.0472 inch galvanized steel.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install firestopping systems to comply with requirements listed in testing agency's directory for indicated fire-resistance rating and per manufacturer's written instructions.
- B. In existing conditions, open device, fit around the penetrants and then slide into the opening.
- C. In new construction, prepare opening by cutting correct size hole. Remove foam visual/smoke seals and safely store until time for their installation. Slide device into opening
- D. Dependent upon installation, secure device with manufacturer's standard mounting brackets, stud brackets, or manufacturer's recommended fire barrier sealant. Install penetrants as specified and secure per local codes. Install foam visual/smoke seals flush with device ends.

3.2 EXAMINATION

- A. Examine substrates and conditions for compliance and ratings. Requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of Work.

3.3 THROUGH-PENETRATION FIRE BARRIER SYSTEM INSTALLATION

- A. General: Install fire barrier systems and fire barrier products to comply with Part 1 "Performance Requirements" Article and with fire barrier products manufacturer's written installation instructions and published drawings for products and applications indicated.

3.4 IDENTIFICATION OF OPENINGS

- A. Identify fire barrier penetrations with preprinted paper labels. Attach labels permanently to surfaces attached to or within 6 inches of edge of fire barrier products so that labels will be visible to anyone seeking to remove fire barrier product(s). Use appropriate fastening methods for labels. For paper plastic or metal labels that are self made, use adhesive that will result in partial destruction of label if removal is attempted. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration fire barrier system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration fire barrier system manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Inspecting Agency: Engage a qualified local building inspector or independent inspecting agency to inspect through-penetration fire barrier installations. Independent inspecting agency shall comply with ASTM E2174 requirements including those related to qualifications, conducting inspections, and preparing test reports.
- B. Repair, update or replace fire barrier systems that are deficient so they comply with requirements.
- C. Proceed with enclosing fire barrier systems with other construction only after inspection reports are issued and fire barrier system installations comply with requirements.

3.6 CLEANING

- A. After installation, remove left over material and debris from work area.

3.7 PROTECTING

- A. Protect fire barrier materials and maintain conditions during and after installation that ensure that through-penetration fire barrier systems are without damage or deterioration at time of substantial completion. Cut out and remove damaged or deteriorated through-penetration fire barrier systems immediately and install new materials to produce systems complying with specified requirements.

END OF SECTION 07841

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data and color Samples.
- C. 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.

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 General Exterior Use Where Another Type Is Not Specified:
 - 1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.
- C. Sealants for masonry to masonry and masonry to metal – Dow Corning 790 (or approved equal). Color to be selected by Owner from standard color chart.
 - 1. Contractor shall install the appropriate backer rod per the window manufacture's requirements between the aluminum window frames and brick surround.
- D. Sealants for metal to metal metal – Dow Corning 795 (or approved equal). Color to be selected by Owner from standard color chart.
 - 1. Contractor shall install the appropriate backer rod per the window manufacture's requirements between the aluminum window frames and brick surround.
- E. Sealant for Exterior Limestone (CFA Buildings):
 - 1. Product:
 - a. Dow Corning 795 – Silicone Building Sealant
 - 2. Color: Limestone
- F. Sealant for Exterior Traffic-Bearing Joints:
 - 1. DynaTred non-sag, traffic grade polyurethane sealant by Pecora Corporation.
- G. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and Around Plumbing Fixtures:
 - 1. Product:

- a. Lexel all purpose super elastomeric, mildew resistant, scrubbable, paintable caulk or approved equal.
 2. Color: Submit standard colors for approval
 3. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses NT, G, A, and O; formulated with fungicide.
- H. Sealant for Interior Use at Perimeters of Door and Window Frames:
1. Product:
 - a. Lexel all purpose super elastomeric, mildew resistant, scrubbable, paintable caulk or approved equal.
 2. Color: Submit standard colors for approval
 3. Latex sealant, single-component, non-sag, mildew-resistant, paintable, acrylic-emulsion sealant complying with ASTM C 834.
- I. Acoustical Sealant for Exposed Interior and Concealed Joints:
1. Product:
 - a. SHEETROCK brand Acoustical Sealant by U.S.G. No substitutions for CFA A HVAC Replacement.
 - b. Acoustiblok Sound Sealant Caulk by Acoustiblok, 6900 Interbay Boulevard, Tampa, Florida U.S.A. 33616 Telephone:+1 (813) 980-1400 Fax: +1 (813) 849-6347 - <http://www.acoustiblok.com/>
- J. Sealant for furnace/boiler vents to chimney:
1. Remove dried, cracked, chipped mortar sealant at furnace/boiler vents and replace with new ceramic flue sealant specifically designed for this application. Submit material to be used to Owner for review and approval.

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 GENERAL

- A. Inspect field conditions prior to application of joint sealants. Prepare joints to receive sealants and coordinate installation with other work.

3.2 INSTALLATION

- A. Comply with ASTM C 1193.
- B. Comply with ASTM C 919 for use of joint sealants in acoustical applications.
- C. Install sealants in continuous uniform bead. Mask adjacent surfaces where necessary for neat installation.
- D. Prime all joints as required prior to installing sealant in accordance with manufacturer's written instructions.
- E. Installations may be rejected solely on the basis of visual appearance by the Owner's representative.

END OF SECTION 07920

SECTION 08110 – STANDARD STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE:

- A. Temporary facilities and controls are specified in Section 01500. Cooperate in ensuring adequate protection.
- B. General material, equipment and workmanship standards are specified in Section 01600.
- C. Wood doors are specified in Section 08550.
- D. Hardware is specified in Section 08710.
- E. Glazing is specified in 08800.

1.2 SUBMITTALS

- A. Submittal requirements and procedures are specified in Section 01301.
- B. Submit shop drawings for work specified in this section. Indicate types of anchorage. Indicate method used to seal tops of exterior doors.
- C. Submit product data showing conformity with requirements stated below. Indicate metals, corrosion protection, types of primers used and other data.

1.3 CODE COMPLIANCE

- A. Exterior doors shall comply with the requirements of the State of Connecticut Basic Building Code. Doors shall be certified to meet required air infiltration limits.

PART 2 - MATERIALS

2.1 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 1011.
- B. Cold-Rolled Steel Sheets: ASTM A 1008 or ASTM A 620, annealed, and free from scale, pitting rust and other defects.
- C. Galvanized Steel Sheets: ASTM A 653/A 653M, A60 or G60 coating. All parts of exterior doors and frames shall be galvanized, mill-phosphatized stock bearing. Used galvanized material for interior doors and frames where scheduled for same.
 - 1. If interior parts of galvanized doors and frames are not galvanized, they shall be primed with rust-resistant primer, as specified below. If doors and frames scheduled to be galvanized contain parts which are not corrosion-protected by galvanizing or primer, they will be rejected by the Owner.

2.2 STEEL DOORS AND FRAMES

- A. Products:
 - 1. Standard Steel Doors.

- B. Steel Doors: Complying with ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level indicated, 1-3/4-inch- thick, unless otherwise indicated.
1. Exterior Doors: Fabricated of 16 gauge, zinc coated carbon steel sheets of commercial quality, mill phosphate, hot-dipped galvanized conforming to ASTM A-526 with designation ZF275 (A60).
 - a. Exterior doors shall have a "POLYSTYRENE" core providing a "U" factor of 0.26 and an "R" value of 3.75 or better.
 - b. Provide steel doors that closely match the style and raised panel layout of the doors being replaced. Provide flush doors at locations where flush doors are being replaced, unless otherwise noted.
- C. Hatchway Replacement Doors:
1. Products:
 - a. Gordon Corporation Replacement Door or approved equal.
(www.gordoncelladoor.com)
 - 1) Model RD or Model CD depending upon existing conditions.
 - 2) Foundation Plates: As required based upon existing conditions.
 - 3) Extensions: As required based upon existing conditions.
- D. Frames: ANSI A250.8; conceal fastenings, unless otherwise indicated.
1. Exterior frames shall be fabricated of 14 gauge, zinc coated carbon steel sheets of commercial quality, mill phosphate hot dipped galvanized conforming to ASTM A526 with designation ZF275 (A60).
 2. All frame corners shall be mitered or coped and continuously welded. All welds shall be ground smooth and finished with a coat of zinc rich primer.
- E. Gauges:
1. Interior frames: 16 gauge.
 2. Exterior frames: 14 gauge.
 3. Interior doors: 18 gauge.
 4. Exterior doors: 16 gauge.
 5. Reinforcement for surface applied hardware: 12 gauge plate or 14 gauge formed section.
 6. Lock, strike and flush blot reinforcement: 12 gauge plate or 14 gauge formed section.
 7. Hinge reinforcement: 7 gauge.
 8. Glass moldings: 20 gauge.
 9. Louvers: 18 gauge frame and 20 gauge blades.
- F. Glazing: For UL rated doors: UL approved ¼" clear polished wire glass with square or diamond pattern wire reinforcement. Provide UL labels on both doors and frames where indicated. Unless otherwise scheduled, "B labels" shall mean "1-1/2 hour B label". Cores shall be as required for UL label. Doors and frames shall conform to the requirements of ASTM E 152-81A, including time-temperature curve performance.
- G. Glazing Stops: Non-removable stops on outside of exterior doors and on secure side of interior doors; screw-applied, removable, glazing stops on inside. If screw type, grease screws to prevent rusting and mortar embedment.

- H. Door Silencers: Three on strike jambs of single-door frames and two on heads of double-door frames.
- I. Plaster Guards: Provide where mortar might obstruct hardware operation.
- J. Supports and Anchors: Not less than 0.042-inch- thick galvanized steel sheet. Provide frame anchors of the proper type for adjoining construction.
- K. Prepare doors and frames to receive mortised and concealed hardware according to ANSI A250.6 and ANSI A115 Series standards.
- L. Reinforce doors and frames to receive surface-applied hardware.
- M. Prime Finish: For non-galvanized steel, manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria. For galvanized steel, primer shall be zinc dust-zinc oxide primer or other primer certified by manufacturer for excellent adhesion to galvanized steel.

2.3 FINISHING

- A. Thoroughly clean all contaminants from surface by washing with clean “Green label” solvent and wiping with clean cloths.
- B. Treat with phosphate pretreatment.
- C. Prime with specified primer. Cover all surfaces, including edges. Apply primer so that it penetrates seams.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Anchor work securely to adjacent construction.
- B. Set frames accurately, plumb, and square. Brace until attached to permanent adjacent construction.
- C. Fill frames with solid mortar where they are installed in masonry walls or partitions.
- D. Place steel frames to comply with SDI 105.
 - 1. Fire-Rated Frames: Install according to NFPA 80.
- E. Install doors to comply with ANSI A250.8. Provide galvanized shims as necessary to comply with SDI 122 and ANSI/DHI A115.1G.
 - 1. Fire-Rated Doors: Install with clearances specified in NFPA 80.
 - 2. Smoke-Control Doors: Comply with NFPA 105.
- F. After installation, remove protective wrappings from doors and frames and touch up prime coat with compatible air-drying primer. Apply finish coats in accordance with Division 9 specifications.

END OF SECTION 08110

SECTION 08212 - STILE AND RAIL WOOD DOORS

PART 1 - GENERAL

1.1 PROJECT CONDITIONS

- A. This Section specifies products for renovation projects. The intent is to provide doors that closely match the style of existing doors. Some products specified in Part 2 may not be applicable to all installations. Matching of custom doors is not part of the work in this Section.

1.2 SECTION REQUIREMENTS

- A. Division 1 – General Requirements shall be made a part of this section.
- B. Hardware is specified in Section 08710.
- C. Finish painting is specified in Section 09910.
- D. Submittals: Product Data, Shop Drawings, door schedule including details of construction.
- E. Quality Standard: WDMA I.S.6, "Industry Standard for Wood Stile and Rail Doors." AWI Quality Standards, latest edition.
- F. Fire-Rated Wood Doors: Labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing per NFPA 252. Test at atmospheric pressure NFPA 252. After 5 minutes, the neutral pressure level shall be 40 inches or less above the sill.

PART 2 - PRODUCTS

2.1 STILE AND RAIL DOORS

- A. Interior Doors: WDMA Premium or Select grade made from Idaho white, lodgepole, ponderosa, or sugar pine with raised or flat panels. All interior raised panel doors shall match the existing door panel layout and shall be submitted to the Owner for review and approval.
 - 1. Quality grade: Custom.
 - 2. Doors shall have solid stiles and rails.
 - 3. Face veneer: Grad B hardwood for painted finish.
 - 4. Coordinate peep hole requirements with Owner.
- B. Interior Fire-Rated Doors: WDMA Premium or Select grade made from Idaho white, lodgepole, ponderosa, or sugar pine with 1-3/4-inch- thick stiles and rails and 1-3/8-inch- thick raised panels. All interior raised panel doors shall match the existing door panel layout and shall be submitted to the Owner for review and approval.
 - 1. Core type: AWI Type FD $\frac{3}{4}$, with $\frac{3}{4}$ hour label. Doors and frames shall conform to the requirements of ASTM E 152-81A, including time-temperature curve performance. Fire rated doors shall have hinge inserts allowing full strength for full mortise hinges.

2.2 FABRICATION AND FINISHING

- A. Factory fit doors to suit frame-opening sizes and to comply with referenced quality standard.
 - 1. Provide 1/8-inch clearance at jambs, heads, and meeting stiles and 1/2 inch at bottom. At thresholds, provide 3/8-inch clearance.
 - 2. Comply with NFPA 80 for fire-resistance-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Prep for thru-bolting on fire rated doors if recommended by door manufacturer.
- C. Glaze doors and sidelights at factory.
- D. Factory prime doors, including all surfaces, according to AWI.
- E. Ship doors individually wrapped in protective packages.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fire-rated wood door frames level, plumb, true, and aligned with adjacent materials. Countersink fasteners, fill surface flush, and sand smooth.
- B. Install fire-rated doors to comply with NFPA 80.
- C. Align and fit doors in frames with uniform clearances and bevels indicated below. Machine doors for hardware. Seal cut surfaces after fitting and machining.
 - 1. Provide 1/8-inch clearance at jambs, heads, and meeting stiles and 1/8 inch at bottom. At thresholds, provide 1/4-inch clearance from bottom of door.
- D. Align factory-fitted doors in frames for uniform clearances.
- E. Repair, refinish, or replace factory-finished doors damaged during installation as directed by Owner's representative.
- F. After installation, remove protective wrappings from doors and frames and touch up prime coat with compatible air-drying primer. Apply finish coats in accordance with Division 9 specifications.

END OF SECTION 08212

SECTION 08311 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements shall be made a part of this section.
- B. Submittals: Product Data.
- C. Fire-Rated Access Doors and Frames: Labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing per the following:
 - 1. Vertical Access Doors: NFPA 252 or UL 10B.
 - 2. Horizontal Access Doors and Frames: ASTM E 119.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M.
- B. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M or ASTM A 620/A 620M.
- C. Stainless-Steel Sheets: ASTM A 666, Type 304.

2.2 ACCESS DOORS AND PANELS

- A. General: Provide Stainless steel access doors in areas with showers.
- B. Flush, Insulated, Fire-Rated Access Doors: Prime-painted or Stainless-steel, self-latching units with automatic closer, with trimless frame.
- C. Flush Access Doors with Exposed Trim: Prime-painted or Stainless-steel units.
- D. Trimless, Flush Access Doors for Gypsum Board: Prime-painted steel or Stainless-steel units.
- E. Locks: Flush to finished surface, key operated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install access doors and panels accurately in position. Adjust hardware and door and panels for proper operation.
- B. Install fire-rated access doors and panels according to NFPA 80.
- C. After installation, remove protective wrappings from doors and frames and touch up prime coat with compatible air-drying primer. Apply finish coats in accordance with Division 9 specifications.

END OF SECTION 08311

SECTION 08541 – FIBERGLASS WINDOWS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Integrity from Marvin All Ultrex[®] Series windows complete with hardware, glazing, weather strip, insect screen and half screen, grilles-between-the glass, jamb extension, sheet rock return, j-channel, and standard or specified anchors, trim and attachments.
- B. Pella Impervia Duracast Windows complete with hardware, glazing, weather strip, insect screen and half screen, grilles-between-the glass, jamb extension, sheet rock return, j-channel, and standard or specified anchors, trim and attachments.

1.2 RELATED SECTIONS

- A. Section 01301—Submittal Procedures: Shop Drawings, Product Data, and Samples.
- B. Section 01505—Construction Waste Management
- C. Section 01631—Substitutions
- D. Section 01740—Warranty
- E. Section 06200—Millwork: Wood trim other than furnished by window manufacturer
- F. Section 07920—Joint Sealants: Sill sealant and perimeter caulking
- G. Section 09900—Painting: Paint or stain other than factory applied finish

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. E 283: Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
 - 2. E 330: Standard Test Method for Structural Performance of Exterior Windows, Curtains Walls, and Doors by Uniform Static Air Pressure Difference.
 - 3. E 547: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
 - 4. E 774: Specification for Sealed Insulated Glass Units.
 - 5. C 1036: Standard Specification for Flat Glass.
- B. Sealed Insulating Glass Manufactures Association / Insulating Glass Certification Council (SIGMA / IGCC).
- C. American Architectural Manufacturers Association / Window and Door Manufacturers Association (AAMA / WDMA):
 - 1. ANSI/AAMA/NWWDA 101 / I.S.2-97: Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
 - 2. 101/I.S. 2/NAFS-02: Voluntary Performance Specification for Windows, Skylights and Glass Doors/
- D. Window and Door Manufacturers Association (WDMA): Hallmark Certification Program.

- E. American Architectural Manufacturers Association (AAMA): 613: Voluntary Performance Requirements and Test Procedures for Organic Coatings on Plastic Profiles.
- F. National Fenestration Rating Council (NFRC): 101: Procedure for Determining Fenestration Product Thermal Properties.

1.4 SYSTEM DESCRIPTION

- A. Design and Performance Requirements:
 - 1. Window units shall be designed to comply with ANSI / AAMA / NWWDA 101 / I.S.2-97 and 101 / I.S. 2/ NAFS-02
 - a. Double Hung: H-LC50
 - b. Transom: TR-C50
 - c. Picture: F-C50
 - 2. Air leakage shall not exceed the following when tested at 1.57 according to ASTM E 283: .03 cfm per square foot of frame.
 - 3. No water penetration shall occur when units are tested at the following pressure according to ASTM E 547:
 - a. Double Hung: H-LC50 – 7.5 psf
 - b. Transom: TR-C50-7.5 psf
 - c. Picture: F-C50-7.5 psf
 - 4. Units shall be designed to comply with ASTM E330 for structural performance when tested at the following pressures:
 - a. Double Hung: H-LC50 - 75 psf
 - b. Transom: TR-C50-75 psf
 - c. Picture: F-C50-75 psf

1.5 SUBMITTALS

- A. Shop Drawings: Submit shop drawings under provisions of Section 01301.
- B. Product Data: Submit catalog data under provisions of Section 01301.
- C. Samples:
 - 1. Submit corner section under provisions of Section 01301.
 - 2. Include glazing system, quality of construction, and specified finish.
- D. Quality Control Submittals: Submit manufacturer's certifications indicating compliance with specified performance and design requirements under provisions of Section 01301.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Emergency Egress or Rescue: Comply with requirements for sleeping units of IBC International Building Code and BOCA Basic Building Code.

1.7 DELIVERY

- A. Deliver in original packaging and protect from weather.

1.8 STORAGE AND HANDLING

- A. Prime or seal wood surfaces, including surface to be concealed by wall construction, if more than thirty (30) days will expire between delivery and installation.
- B. Store window units in an upright position in a clean and dry storage area above ground and protect from weather.

1.9 WARRANTY

- A. Windows shall be warranted to be free from defects in manufacturing, materials, and workmanship for a period of ten (10) years from purchase date.
- B. Window glass shall be warranted to be free from defects in manufacturing, materials and workmanship for period of twenty (20) years from the purchase date.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

- A. Integrity from Marvin All Ultrex[®] Series Double Hung (horizontal sliding and related stationary or picture units) as manufactured by Integrity Windows and Doors, Fargo, North Dakota or approved equal. Operating sash tilt to interior for cleaning or removal.
- B. Pella Duracast[®] replacement windows come in single/double hung, fixed frame, sliders and special shapes.
- C. Approved equal

2.2 FRAME DESCRIPTION

- A. Interior: Pultruded reinforced fiberglass (Ultrex[®]), 0.065 – 0.070 inch (2 mm) thick.
- B. Frame width: 3 3/32 inches (79 mm).
- C. Jamb depth: 2 inches (51 mm).

2.3 SASH DESCRIPTION

- A. Pultruded reinforced fiberglass (Ultrex[®]), 0.065 – 0.070 inch (2 mm) thick.
- B. Composite sash thickness: 15/16" inches (24 mm).

2.4 GLAZING

- A. Select quality complying with ASTM C 1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E 774.
- B. Glazing method: 3/4 inch (19 mm) Insulated glass.
- C. Glass type: Low E³ 366TM – Argon gas.
- D. Glazing seal: Silicone bedding at exterior and interior.
- E. Obscure Glass: Contractor shall provide obscure glass for all bathroom windows.

- F. Tempered Glass: Contractor shall provide tempered glass per code requirements for site specific areas related to window height above the finish floor or windows located in the travel path at stairs.

2.5 FINISH

- A. Factory baked on acrylic urethane.
- B. Color: Verify color selection with Owner. Options include: Stone White exterior with Stone White interior, standard color; Pebble Gray exterior with Stone White interior; Bronze exterior with Stone White interior; Evergreen exterior with Stone White interior; Cashmere exterior with Stone White interior; Ebony exterior with Stone White interior.

2.6 HARDWARE

- A. Balance System: Coil spring block and tackle with nylon cord and glass filled nylon shoe and steel locking shoe.
- B. Jamb Track: Pultrusion.
- C. Lock: High pressure zinc die-cast cam lock and keeper.
 - 1. Finish: Phosphate coated and electrostatically painted. Color: White.
- D. Sash Limiter: Sash limiter maximum shall be set to 6" for all 1st floor undergraduate housing. Sash limiter maximum shall be set to 8" for all 1st floor graduate housing.

2.7 WEATHER STRIP

- A. Sill weather strip is foam filled vinyl bulb. The bottom sash is sealed to the jambs using rigid vinyl with flexible seals. The top stationary sash seal is foam tape. The checkrails are sealed using rigid vinyl with flexible seals.

2.8 JAMB EXTENSION

- A. Standard: 2". Contractor shall order factory installed jamb extensions at 4-9/16" or 6-9/16" based on existing field conditions.

2.9 INSECT FULL SCREEN

- A. Factory installed full screen. Screen mesh: Charcoal fiberglass.
- B. Aluminum frame finish: Stone White, standard color; Pebble Gray; Bronze; Evergreen; Cashmere; Ebony.

2.10 GRILLES-BETWEEN-THE-GLASS (GBG)

- A. Manufactured from aluminum in an 11/16" (17mm) wide contoured profile placed between the two panes of glass. Available in rectangular, prairie lite cut, 2w2h, and 2w1h patterns. Verify with Owner lite pattern for specific installation location.
- B. To preserve the architectural and historic integrity of the buildings on campus, all new and replacement windows being installed must match the existing divided light pattern and **color**.

- a. Prior to ordering any windows, window shop drawings showing all relevant details and the divided light pattern, product data and samples must be submitted to and approved by the Owner for each specific project.
- C. Colors: Verify color selection with Owner. Options include: Stone White exterior with Stone White interior; Pebble Gray exterior with Stone White interior; Bronze exterior with Stone White interior; Evergreen exterior with Stone White interior; Cashmere exterior with Stone White interior; Ebony exterior with Stone White interior.

2.11 ACCESSORIES AND TRIM

- A. Installation Accessories:
 - 1. Factory installed vinyl folding nailing fin at head, sill and side jambs.
 - 2. Installation brackets: Brackets for 4-9/16 inch (116 mm); 6-9/16 inch (167 mm) jambs.
 - 3. Sheet rock return.
 - 4. J-channel.
 - 5. Mullion kit: Standard mullion kit for field assembly of related units available in horizontal, vertical and 2-wide and/or 2-high configurations. Kit includes: Instructions, interior and exterior mull covers, mull plugs and brackets.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Before Installation, verify openings are plumb, square, and of proper dimension. Report frame defects or unsuitable conditions to the General Contractor before proceeding.
- B. Acceptance of Conditions: Beginning of installation confirms acceptance of existing conditions.

3.2 INSTALLATION

- A. Prior to installing new windows, Contractor shall remove existing sash, sash weights and sash cords. Contractor shall fill sash weight pockets with cotton batt insulation, apply sealant to head and jambs of existing sash stops and then install new window(s). Contractor shall fill voids between old and new with expanding foam, trim interior with new trim pieces as required and seal perimeter interior with clear paintable caulk to eliminate the potential for any air infiltration.
- B. Assemble and install window unit according to manufacturer's instructions and reviewed shop drawings.
- C. Set units level, plumb, and true to line, without warp or rack of frames and panels and anchor securely in place.
- D. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- E. Adjust operating panels, screens, and hardware for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- F. Install accessory items as required.
- G. Use finish nails to apply wood trim and moldings.

- H. Completely caulk around the exterior perimeter of all new windows installed.
- I. Touch up damaged paint on window trim to match existing finish color. Paint all new window trim to match existing.
- J. Install window shade hardware. Cut existing window shades to fit new opening. Provide new window shades where missing or damaged.
- K. At no additional cost to owner, repair or replace window units not meeting specified performance requirements.

3.3 CLEANING

- A. Remove visible labels and adhesive residue according to manufacturer's instructions.
- B. Clean interior and exterior windows and glass and leave in a clean condition upon completion of the project.

3.4 PROTECTING INSTALLED CONSTRUCTION

- A. Protect windows from damage by chemicals, solvents, paint, or other construction operations that may cause damage.

END OF SECTION

SECTION 08550 - WOOD WINDOWS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements shall be made a part of this section.
- B. Submittals: Product Data, Shop Drawings, and color Samples.
- C. Quality Standard: Comply with AAMA/NWWDA 101/I.S.2.

PART 2 - PRODUCTS

2.1 WOOD WINDOWS

- 1. Manufacturer: Trimline, Eagle Window & Door, Inc., Marvin, Pella, Anderson, or approved equal.
- 2. Basis of design is as follows:

WINDOWS – For all locations, carefully salvage and reuse existing interior and exterior trim or provide new trim to match existing based on the condition of the trim at each window location. All rotted trim material shall be removed and replaced. Trim material and profiles shall match existing and must be submitted to and approved by the Owner prior to installation.

- a. Exterior Finish: Clad window.
- b. Exterior Color: Submit manufacturer's standard colors for approval.
- c. Interior Finish: Primed, ready for field painting by contractor or primed with factory applied topcoat.
- d. Interior Color: Submit manufacturer's standard colors for approval.
- e. Wood Species: Pine
- f. Glass: Low-E Maximizer Plus insulating glass with argon gas filling.
- g. Sash Locks: Two (2) locks with concealed tilt mechanisms. Provide standard colors for approval
- h. Sash Lifts: Submit manufacturer's standard sash lifts for approval
- i. Security travel stops: maximum 6" opening (first floor only). In addition, provide vinyl snap in inserts in track to allow maximum window opening of 6".
- j. Hardware Finish: Submit manufacturer's standard finishes for approval.
- k. Window Sizes: Field measure as required for each individual project.
- l. Screens: Half size, with fiberglass mesh and aluminum frame. Color to be selected from manufacturer's standard colors.

- m. Cleaning: Top and bottom sash shall tilt inward 90° for easy cleaning.
- n. Modern Divided Lights: Available in 7/8", 1 1/8" or 1 1/2" profiles. Adhered interior and exterior bars; spacers between glass.
 - 1) **To preserve the architectural and historic integrity of the buildings on campus, all new windows being installed must match the existing divided light pattern and color.**
 - a) **Prior to ordering any windows, window shop drawings showing all relevant details and the divided light pattern, product data and samples must be submitted to and approved by the Owner for each specific project.**
- 3. Interior Trim: Provide new trim as required. Trim material and profiles shall match existing and must be submitted to and approved by the Owner prior to installation.
- 4. Exterior Trim: Wrap window stops and trim with sheet aluminum. Provide manufacturer's color selection for Owner's approval.
- 5. Thermal Transmittance: Provide units with a whole-window R-value of 2.5 or greater at 15 MPH exterior wind velocity per AAMA 1503.
- 6. Provide simulated or true divided lites where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set units level, plumb, and true to line, without warp or rack of frames and panels and anchor securely in place.
- B. Remove existing sash and sash weights. Fill sash weight pockets with approved insulation materials in the frame cavity on the interior portion of the window frame, area adjacent to exterior of window frame remaining uninsulated.
 - 1. Exercise caution to avoid overlapping insulation materials across thermal barrier connectors.
 - 2. Exercise caution to avoid bridging of the two separated frame members.
- C. Trim interior with new trim pieces as required.
- D. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction. Apply caulking at all points between exterior building materials and outer frame; apply in a manner to ensure airtight and watertight continuous perimeter seal so as to prohibit seepage of cold air into the insulated cavity.
- E. Touch up damaged paint on window trim to match existing finish color. Paint all new and replaced window trim to match existing.
- F. Install window shade hardware. Cut existing window shades to fit new opening. Provide new window shades where missing or damaged.

- G. Adjust operating panels, screens, and hardware for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- H. At no additional cost to owner, repair or replace window units not meeting specified performance requirements.

0.1 CLEANING

- A. After installation, remove all sealants, caulking, labels and other misplaced materials from all surfaces, including adjacent work.
- B. Thoroughly clean window frames, casings, and glass using materials and methods recommended by the window and glass manufacturer that do not cause defacement of work.

END OF SECTION 08550

SECTION 08561 - VINYL WINDOWS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, and color Samples.
- B. Quality Standard: Comply with AAMA/NWWDA 101/I.S.2.

PART 2 - PRODUCTS

2.1 VINYL WINDOWS

- A. Products: Harvey Vinyl Windows, Pella or approved equal
 - 1. Classic
 - 2. Signature
 - 3. Slimline
 - 4. Style:
 - a. Double-Hung Window
 - b. Rolling Window
 - c. Picture Window
 - d. Hopper Window
 - e. Awning
- B. Provide AAMA-certified vinyl windows with an attached label.
- C. Provide Energy Star certified vinyl windows with an attached label.
- D. Provide units labeled and certified according to NFRC's Product Certification Program for Energy Performance Standards and Ratings with U-factor of 0.56 Btu/sq. ft. x h x deg F as determined according to NFRC 100 for U-factor (thermal transmission); NFRC 200 for SHGC (Solar Heat Gain) and VT (Visible Transmittance); NFRC 400 for Air Leakage; and NFRC 500 for Condensation Resistance. Ratings shall be in conformance and meet or exceed State Building Code requirements.
- E. Sash Locks: Two (2) locks with concealed tilt mechanisms.
- F. Sash Lifts: Submit manufacture's standard sash lifts for approval.
- G. Undergraduate Houses: Security travel stops - maximum 6" opening (first floor only). In addition, provide vinyl snap in inserts in track to allow maximum window opening of 6".
- H. Graduate Houses: Security travel stops - maximum 8" opening (first floor only). In addition, provide vinyl snap in inserts in track to allow maximum window opening of 8".
- I. Faculty/Staff: Standard travel stop.

- J. Hardware Finish: Submit manufacturer's standard finishes for approval.
- K. Window Sizes: Field measure as required for each individual project.
- L. Screens: Half size, with fiberglass mesh insect screens and aluminum frame. White .
- M. Cleaning: Top and bottom sash shall tilt inward 90° for easy cleaning.
- N. **To preserve the architectural and historic integrity of the buildings on campus, all new and replacement windows being installed must match the existing divided light pattern and color, unless directed differently by the Owner.**
 - 1. **Prior to ordering any windows, window shop drawings showing all relevant details and the divided light pattern, product data and samples must be submitted to and approved by the Owner for each specific project.**
- O. Window Color: Submit manufacturer's standard colors to Owner for approval.
- P. Glaze units with clear, low-e coated, argon-filled, sealed insulating glass.
- Q. Provide replacement parts 4 each of following.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set units level, plumb, and true to line, without warp or rack of frames and panels and anchor securely in place.
- B. Prior to installing new windows, Contractor shall remove existing sash, sash weights and sash cords. Contractor shall fill sash weight pockets with cotton batt insulation, apply sealant to head and jambs of existing sash stops and then install new window(s). Contractor shall fill voids between old and new with expanding foam, trim interior with new trim pieces as required and seal perimeter interior with clear paintable caulk to eliminate the potential for any air infiltration.
- C. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.
- D. Adjust operating panels, screens, and hardware for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- E. Touch up damaged paint or stain on window trim to match existing finish color. Paint or stain and polyurethane all new window trim to match existing finish.
- F. Install window shade hardware. Cut existing window shades to fit new opening. Provide new window shades where missing or damaged. Provide new shade hardware as required.

- G. At no additional cost to owner, repair or replace window units not meeting specified performance requirements.
- H. Install accessory items as required.
- I. Use finish nails to apply wood trim and mouldings.
- J. Completely caulk around the exterior perimeter of all new windows installed.

3.2 CLEANING

- A. After installation, remove all sealants, caulking, labels and other misplaced materials from all surfaces, including adjacent work.
- B. Thoroughly clean window frames, casings, and glass, interior and exterior, using materials and methods recommended by the window and glass manufacturer that do not cause defacement of work.

3.3 PROTECTING

- A. Protect windows from damage by chemicals, solvents, paint, or other construction operations that may cause damage.

END OF SECTION 08561

SECTION 08585 – SLIMLINE SECURITY SCREENS – LEVEL 5**PART 1 – GENERAL****1.1 Description**

The screen shown on the plans and herein specified is manufactured by Avant Guards. The manufacturer's name and products have been used to establish the standard of construction and quality of workmanship required for this project. Manufacturers bidding on this project must be actively engaged in the fabrication of specified items for 3 years.

1.2 Submittals

Submit shop drawings to the Owner for review prior to the start of fabrication. Include details of attachment to surrounding materials and elevations showing the quantities and location of each screen required for the project.

1.3 Quality Assurance

Items provided in the section shall be manufactured and fabricated by firms with 3 years experience in type of work specified. Performance and testing must comply with sag, impact, and forced entry resistance tests of ANSI/SMA 6001-1990, American National Standard. Specifications for Protection Screens must meet the performance requirements for a Heavy Rating.

1.4 Delivery, Storage, and Handling

Before and during shipment to site, adequately protect products. Products should be stored in conditions that protect from damage. Installation shall be by installers experienced in type of work specified for respective item.

1.5 Inspection

Verify that openings fit allowable tolerances are plumb, level, provide a solid anchoring surface and comply with approved shop drawings. Plumb and align faces in a single plane and erect doors square and true adequately anchored. After completion of installation, screens shall be in working order and clean.

1.6 Warranty

Manufacturer will supply a written one-year warranty on all products.

1.7 References

American Society for Testing and Materials (ASTM), American Welding Society (AWS).

1.8 3 ½" x 2 ¼" Installation, adjusting, and Clean up

Field measure all windows scheduled to receive security screens. Coordinate all fastening details and requirements with the manufacturer based on existing field conditions. Install in accordance with approved shop drawings and specifications. Erect guards and other work of this section, rigid, straight, and plumb with horizontal lines level. Secure connections and attachment. Adjust guards and hardware and leave in working order where applicable. Clean work of this section upon completion. Remove debris resulting from work of this section.

PART 2 – PRODUCT**2.1 Acceptable Manufacturers**

Avant Guards Manufacturing
219 Cook Street

Brooklyn, NY 11206
(718)366-6565 Fax: (718)366-0010

Keystone Industries, Inc.
105 Mahoning Ave.
16102, New Castle, PA 16102
(800) 648-8341 Fax: (724) 658-0589

2.2 **Slimline Security Screen Materials**

The mainframe is 1"x 1" x 1/8"aluminum tubing. The corners of the mainframe shall be pneumatically inserted into the frame ends with an interference fit. The removable interlocking concealment plate extruded aluminum 1/16"thick shall be attached to the mainframe using tamper-resistant stainless steel screws. A brace is required for guards over 52"high. Scribe angles or channels are optional as per specification.

Infill Requirement:
18 gauge stainless perforated panel, black infill.

2.3 **Fabrication**

Welding shall comply with requirements of AWS. Grind welds smooth. Window guards, unless otherwise shown, shall cover entire window opening. Provide frame and accessories of size and construction as shown on drawings. Window guards over 5' wide or 8' high will be fabricated in two sections.

2.4 **Paint and Finish**

All interior and exterior surfaces of the mainframe and shall be thoroughly cleaned in a three-step bonderizing process. The surfaces shall receive an electro-statically applied thermoplastic polyester powder coating, which shall be applied and baked to a hard mar-resistant finish in a standard or custom color. Provide color samples to Owner for selection.

2.5 **Locks and Hardware**

Concealed 3 1/2" x 2 1/4" F.P. butts brass pin hinges, to have 2 hinges for guards under 5', and 3 hinges per guard 5' and over. The infill hardware consists of bolts, clevises, stainless steel pins, oil tempered coil springs, washers, and full tempered steel 1/8" x 3/8" shock distributing bars.

Lock Options:

Lift Quick
Panic Push
Push Down

END OF SECTION 08585

WESLEYAN UNIVERSITY

SECTION 08710 – DOOR HARDWARE – ACADEMIC/ADMINISTRATIVE BUILDINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general conditions of contract, including general and supplementary conditions and Division 1 specification sections, apply to the work of this Section.

1.2 DESCRIPTION OF WORK

- A. Definition: “Door Hardware” includes items known commercially as Builders Hardware which are required for swing, sliding, and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame. The work of this Section includes the furnishing of all Finish Hardware as required by the plans and Specifications. Types or items in this section include (but are not necessarily limited to):

1. Hinges
2. Lock Cylinders and Keys
3. Lock and Latch Bolts
4. Closers
5. Auxiliary Hardware
6. Weatherstripping
7. Thresholds
8. Electric Hardware, including wiring by this Section up to termination above ceiling by Division 16.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Carefully examine all of the Contract Documents for requirements which affect the work of this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturers: Obtain each kind of hardware (hinges, lock and latch sets, closers, etc.) from only one manufacturer. For standardization and to match University standards, provide all products without further substitution. The numbers listed in the hardware schedule have been taken from catalogs of the following manufacturers:

1. McKinney Mfg.
2. CorbinRuswin
3. Sargent & Company
4. Door Control International
5. Rockwood Manufacturing
6. Pemko Weatherstripping
7. HES

WESLEYAN UNIVERSITY

- B. Fire-Rates Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80. Provide only hardware which has been tested and listed by UL, FM, WH for types and sizes of doors required and complies with requirements of door and door frame labels.

1.5 SUBMITTALS

- A. Hardware Schedule: Submit final hardware schedule in manner indicated below. Hardware schedules are intended for coordination of work.
- B. Final Hardware Schedule Content: Based on Builders Hardware indicated, organize hardware schedule into “Hardware Sets” indicating complete designations of every item required for each door opening. Include the following information.
 - 1. Type, style, function, size and finish of each hardware item.
 - 2. Name of manufacturer of each item.
 - 3. Fastenings and other pertinent information.
 - 4. Location of hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
 - 5. Explanation of all abbreviations, symbol, codes, etc, contained in schedule.
 - 6. Mounting locations for hardware.
 - 7. Door and frame sizes and materials.
- C. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g. Hollow Metal Frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings, and other information essential to the coordinated review of hardware schedule.
- D. Keying: All cylinders shall be CorbinRusswin Patented Removable Core type cylinders and shall be provided with mater keyed brass construction cores. Three keys to be provided per cylinder, 20 each new master keys, and two each Grand Master keys. Permanent cores shall be provided directly to the owner by CorbinRusswin. **No substitutions.**

1.6 JOB CONDITIONS

- A. Coordination: Coordinate hardware with other work. In a timely fashion, furnish information as may be required by other trades. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper times to the proper locations (shop or project site) for installation.
- B. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware.

WESLEYAN UNIVERSITY

- C. Deliver materials and products in sealed and labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

PART 2 – PRODUCTS

2.1 SCHEDULE HARDWARE

- A. Requirements for design, function, finish, size and other distinctive qualities of each type of Builders Hardware are indicated in the Builders Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following:

- 1. Finish shall be 626-630-610-613 unless otherwise noted.

- B. Door Butt Hinges / Continuous Hinges – McKinney

- 1. All exterior doors and high use doors shall have heavy-duty continuous hinges.
 - a. Field verification is required on any existing openings. Hinges to be full surface, where applicable, on these openings.
 - b. Acceptable Manufactures are: McKinney, Pemko, Markar, and Select.

- 2. Interior hinges where needed shall be heavy duty non-ferrous hinges. All other doors shall have full mortise hinges Type TA2714TB – 4 ½". Heavy Weight hinges Type T4A3786 as noted "HW" on high use doors not exceeding 3'6" in width. Size and quantity of hinges is as follows:

- a. 3 Hinges per doors to 7'6" high.
- b. 1 Added hinge for each added 2'6" in height.

- 3. Equivalent items by Stanley (*No Hagar/PBB*) acceptable.

- C. Flush Bolts – Rockwood

- 1. Flush Bolts shall be self latching combination 1845/1945 or automatic 1842/1942 as scheduled. Manual Flush Bolts shall be 550 – 12" for wood doors and 555 – 12" for metal doors. Dust Proof Strikes shall be 570 Series.
- 2. Acceptable substitution – H.B. Ives, Glynn Johnson.

- D. Locksets – CorbinRusswin

- 1. All locksets are Mortise type and must conform to ANSI A156.13, Series 1000, and Operational Grade 1.
- 2. All locksets and latchsets shall have self-aligning thru bolted trim.
- 3. Lever handle trim with hollow cavities are not acceptable.
- 4. Mortise locks and latches shall be CorbinRusswin ML2000 series trim as specified by architect. **No Substitute.**

WESLEYAN UNIVERSITY

5. All cylinders must be manufactured by CorbinRusswin.
 6. Any levers designated for hazardous areas to have engraved knurling, no substitution.
 7. Provide extended **Curved** lip strikes as required.
- E. Panic Bolts – Sargent & Company
1. Panic Bolts shall be Sargent heavy duty touch bar type 80 series with chassis mounted unit construction. Panic bolts shall have high impact lexan touch bar on rail assembly. Rail and chassis cover shall be of heavy gauge stainless steel. All springs shall be of stainless steel. Rails and chassis cover of Aluminum or Zinc are not acceptable.
 2. Panic Bolts for fire doors with rating of 20 minutes or more shall have stainless steel chassis and have UL “Fire Exit Hardware” metal label permanently affixed to the chassis cover (12 prefix). Through bolts shall be provided on all devices.
 3. All exit devices shall be by “less dogging feature”. If dogging is required, it shall be cylinder dogging.
 4. Functions of devices shall be “storeroom” 746 with ETJ (or matching lockset trim) trim unless otherwise noted.
 5. Rim devices to be used and mullions at pairs of doors are preferred.
 6. Where card access is required, exit devices shall be “EL” function.
 7. CorbinRusswin ED5000/4000 device with P957 Trim or Precision Manufacturing 2000 series devices will be an acceptable substitute.
 8. In general, no exit devices shall be concealed in the door.
 9. Finish shall be 630 US32D or as noted by architect.
- F. Electric Strikes – HES
1. Alternate Model 1006 Series with Smart-Pac power controller and latch bolt monitor as manufactured by HES.
- G. Door Closers – LCN
1. Door Closers shall be **4110** series with adjustable spring and cover. Closing and latching speed shall be fully adjustable by means of two individual valves. Backcheck shall be controlled by a fully adjustable backcheck valve. Door closer shall be sized in accordance with manufacturer’s recommendation. Closers shall meet ANSI Grade 1.
 2. Acceptable substitution – Sargent 1431 – Norton 7500.
- H. Kick Plates & Armor Plates – Rockwood
1. Kick Plates and Armor Plates shall be stainless steel (630). Size shall be 16” x 2” LTDW, except 1” LTDW for pairs of doors.
 2. Acceptable substitutions – H.B. Ives, Quality.
- I. Wall Bumpers and Door Stops – Rockwood
1. Wall Bumpers shall be type 409. Provide wherever possible.
 2. Where it is impossible to mount on wall, provide door stop 440 or 442 as required.
 3. Roller Bumper shall be Type 456.

WESLEYAN UNIVERSITY

4. Acceptable substitutions – H.B. Ives, Glynn Johnson.
 - J. Thresholds and Weatherstripping – Pemko
 1. Provide aluminum thresholds as detailed on the drawings. Weatherstripping shall be 315DN sill type and S88D head and jamb type for all exterior doors. Meeting stile weatherstripping shall be 305DN. Thresholds shall be type 271B x ESMS or as detailed. Drop seals Type 434 APKL.
- 1.2 MATERIAL AND FABRICATION
- A. General:
 - B. Hand of Door: The drawings show the direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown.
 - C. Base Metals: Produce hardware units of the basic metal and forming method indicated, using the manufacturer's standard metal allow, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable hardware units FS FF-H-106, FS FF-6-111, FS FF-H-116, do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
 - D. Fasteners: Manufacturer's hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
 - E. Furnish Screws: for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition screws to match the hardware finish, or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

PART 3 – EXECUTION

Trade Contractor is to receive, check, and store all material. Any discrepancies or shortages are to be reported in writing to the supplier within two weeks of receipt of material.

3.1 INSTALLATION

- A. Mount hardware units as heights indicated in "Recommended Locations for Builders Hardware for standard steel doors and frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by the Owner.
- B. Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in the Section. Beginning work means installer accepts substrates and conditions.

WESLEYAN UNIVERSITY

- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Completely wire all electrified hardware, including connecting from power transfer hinges to electric locks, strikes and the like, and including connecting all of same to power provided above ceiling by Division 16 except for work by security/access system by another contract.

3.2 ADJUST AND CLEAN

- A. Adjust and check each operation item of hardware and each door to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

Schedule of Sets T.B.D.

END OF SECTION 08710

SECTION 08710w - DOOR HARDWARE-Student Housing

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Deliver keys to Owner.
- B. For fire-rated openings provide hardware tested and listed by UL or FMG (NFPA 80). On exit devices provide UL or FMG label indicating "Fire Exit Hardware."
- C. Obtain Hardware Schedule from Wesleyan University Lock Shop.

1.2 DESCRIPTION OF WORK

- A. Definition: "Door Hardware" includes items known commercially as Builders Hardware which are required for swing, sliding, and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame. The work of this Section includes the furnishing of all Finish Hardware as required by the plans and Specifications. Types or items in this section include (but are not necessarily limited to):
 - 1. Hinges
 - 2. Lock Cylinders and Keys
 - 3. Lock and Latch Bolts
 - 4. Closers
 - 5. Auxiliary Hardware
 - 6. Weatherstripping
 - 7. Thresholds
 - 8. Door Viewers
- B. Electric Hardware, including wiring by this Section up to termination above ceiling by Division 16.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Carefully examine all of the Contract Documents for requirements which affect the work of this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturers: Obtain each kind of hardware (hinges, lock and latch sets, closers, etc.) from only one manufacturer. For standardization and to match University standards, provide all products without further substitution. The numbers listed in the hardware schedule have been taken from catalogs of the following manufacturers:
 - 1. McKinney Mfg.

2. Pemko
3. Arrow Lock
4. KABA
5. Door Control International
6. Rockwood Manufacturing
7. Pemko Weatherstripping

- B. Fire-Rates Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80. Provide only hardware which has been tested and listed by UL, FM, WH for types and sizes of doors required and complies with requirements of door and door frame labels.

1.5 SUBMITTALS

- A. Hardware Schedule: Submit final hardware schedule in manner indicated below. Hardware schedules are intended for coordination of work.

Final Hardware Schedule Content: Based on Builders Hardware indicated, organize hardware schedule into "Hardware Sets" indicating complete designations of every item required for each door opening. Include the following information.

Type, style, function, size and finish of each hardware item.

Name of manufacturer of each item.

Fastenings and other pertinent information.

Location of hardware set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.

Explanation of all abbreviations, symbol, codes, etc, contained in schedule.

Mounting locations for hardware.

Door and frame sizes and materials.

- C. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g. Hollow Metal Frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings, and other information essential to the coordinated review of hardware schedule.
- D. Keying: All cylinders shall be KABA interchangeable core type for EXTERIOR(Kaba 6840) and CONVENTIONAL (3400) on interior locks. Cylinder to be master keyed to owners existing Patented Key System. All keys, biting lists, and cores will be shipped directly to the University for inspection and installation.

1.6 JOB CONDITIONS

- A. Coordination: Coordinate hardware with other work. In a timely fashion, furnish information as may be required by other trades. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper times to the proper locations (shop or project site) for installation.

- B. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware.
- C. Deliver materials and products in sealed and labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

PART 2 – PRODUCTS

2.1 SCHEDULE HARDWARE

- A. Requirements for design, function, finish, size and other distinctive qualities of each type of Builders Hardware are indicated in the Builders Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following:
 - B. Finish shall be 630, 605 or 626 where noted. Verify finish by location with Owner.
 - C. Door Butt Hinges / Continuous Hinges – McKinney
 - 1. Interior hinges where needed shall be a standard weight either 3.5 “, 4” or 4.5” as dictated by door/frame condition.
 - 2. All exterior doors shall have standard weight, 2 ball bearing 4.5” high (minimum) full mortise hinges. If butt hinges can not work then a continuous hinge maybe used, if applicable.
 - a. 3 Hinges per doors to 7’6” high.
 - b. Add 1 hinge for each additional 2’6” of height.
 - c. If door exceeds 36” in width, height of hinge to be 5.”
 - 3. Self closing hinges shall be manufactured by McKinney.
 - D. Flush Bolts – Rockwood
 - 1. Flush Bolts shall be self latching combination 1845/1945 or automatic 1842/1942 as scheduled. Manual Flush Bolts shall be 550 – 12” for wood doors and 555 – 12” for metal doors. Dust Proof Strikes shall be 570 Series.
 - 2. Acceptable substitution – H.B. Ives, Glynn Johnson.
 - E. Locksets – Arrow Lock
 - 1. Exterior:
 - a. All Exterior locksets are heavy duty cylindrical and must conform to ANSI A156.2, Series 4000, Operational Grade 1.
 - b. All locksets and latchsets shall have self-aligning thru bolted trim.
 - c. Lever handle trim with hollow cavities are not acceptable.
 - d. Exterior locks shall be Arrow Q-12-BR-R-605-2.75” BS x ASA - IC. No Substitute.
 - 2. Suite Entry Door(s):
 - a. All Exterior locksets are heavy duty cylindrical and must conform to ANSI A156.2, Series 4000, Operational Grade 1.
 - b. All locksets and latchsets shall have self-aligning thru bolted trim.
 - c. Lever handle trim with hollow cavities are not acceptable.
 - d. Exterior locks shall be Arrow Q-12-BR-R-605-2.75” BS x ASA - IC. No Substitute.

Wesleyan University

3. Interior:
 - a. All Interior locks to be standard-duty cylindrical
 - b. Interior locks to be Arrow RK-11-TA-626-306-121/124 No Substitute.
 - c. Interior Privacy locks to be RK-02-TA-626-306-121/124 No Substitute.

 4. All cylinders must be manufactured by "KABA".
 - a. ALL permanent keyed cylinders will be supplied and installed By Owner. Any construction or temporary cylinders will be at the contactor's expense.
 5. Provide extended Curved lip strikes as required.
 6. Provide 4 cut keys per keyset.
 7. Provide 20 each Kaba key blanks.
- A. 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.
- B. Provide wall stops or floor stops for doors without closers.
1. Rockwood high dome door stop, Model #442 or approved equal
- C. Door Viewer:
- D. 1. 190 Degree, Mc Kinney Mfg. No. DV3 or approved equal. To be provided for all new doors installed.

PART 2 - PART 3 - EXECUTION

Trade Contractor is to receive, check, and store all material. Any discrepancies or shortages are to be reported in writing to the supplier within two weeks of receipt of material.

3.1 INSTALLATION

- A. A.Letter to manufacturer from Owner is required. Coordinate cylinder allocation with Owner. Contractor to carry costs of all hardware.

- B. B.Mount hardware units as heights indicated in "Recommended Locations for Builders Hardware for standard steel doors and frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by the Owner.

- C. C.Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in the Section. Beginning work means installer accepts substrates and conditions.

- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

- E. Drill and countersink units which are not factory prepared for anchorage fasteners. Space

fasteners and anchors in accordance with industry standards.

- F. Completely wire all electrified hardware, including connecting from power transfer hinges to electric locks, strikes and the like, and including connecting all of same to power provided above ceiling by Division 16 except for work by security/access system by another contract.

3.2 ADJUST AND CLEAN

- A. Adjust and check each operation item of hardware and each door to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

Schedule of sets TBD - Reference Scope of Work

END OF SECTION 08710

SECTION 08720 – WEATHERSTRIPPING & SEALS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 -General Requirements is made a part of this section.
- B. Product Data: Submit manufacturer's product data and installation instructions.

PART 2 - PRODUCTS

2.1 Perimeter Gasketing

- A. Manufacturers
 - 1. Pemko Manufacturing Company or approved equal.

PO Box 3780, 4226 Transport Street, Ventura, CA 93003; Telephone: (800) 283-9988, (805) 642-2600; Fax: (805) 642-4109; E-mail: pemkosales@pemko.com; website: www.pemko.com.

 - a. Material / Finish: clear anodized aluminum or dark bronze anodized aluminum (Material/finish to be selected by Owner based on existing field conditions).
 - b. Manufacturer Model Number: Pemko 29310CV or approved equal based on existing field conditions.

2.2 Brush Weatherstripping – Exterior Doors

- 1. Pemko Model #29326CP or approved equal based on existing field conditions.
 - a. Material / Finish: clear anodized aluminum or dark bronze anodized aluminum (Material/finish to be selected by Owner based on existing field conditions).
- 2. Memtech Inc: Brush Door Seals or approved equal based on existing field conditions.
 - a. 9033 General Drive, Plymouth, MI 48170. Telephone: 800-634-4471. Fax: 800-634-4472. Email: salesinfo@memtechbrush.com

3.2 Acoustic Weatherstripping

- 1. Pemko weatherstripping, compression: type 379CR, sizes as required for specific location.
- 2. Pemko door bottom compression: Type 4131CRL, size as required for specific location.

PART 3 – EXECUTION

3.1 Site Verification of Conditions:

- A. Verify that site conditions are acceptable for installation of perimeter gasketing and brush weatherstrip.
- B. Examine doors and frames for compliance with requirements for door and frame manufacturer's installation tolerances, labeled fire door assembly construction, wall and floor construction and other conditions affecting performance.
- C. Do not proceed with installation of perimeter gasketing or brush weatherstrip until unacceptable conditions are corrected.

3.2 Wood Door Preparation:

- A. Comply with ANSI/WDMA I.S.1-A.
- B. Comply with door manufacturer's positive pressure installation instructions.
- C. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

3.3 Steel Door and Frame Preparation:

- A. Drill and tap doors and frames for hardware per manufacturer's positive pressure installation instructions.
- B. Ensure doors and frames are properly sized, plumb and square.
- C. Comply with ANSI A250.8/SDI-100.
- D. Mounting Location: Comply with the following requirements, unless otherwise indicated:
 - 1. Comply with manufacturer's positive pressure installation instructions.
 - 2. Comply with ANSI A250.8/SDI-100.

3.4 Adjusting:

- A. Perform adjustments required to ensure that perimeter gasketing and brush weatherstrip function in compliance with manufacturer's performance criteria prior to acceptance by Owner.

3.5 Cleaning:

- A. Remove any protective films and clean components as necessary following manufacturer's recommended procedures.

3.6 Protection:

- A. Protect installed work from damage due to subsequent construction activity on the site.

3.7 Warranty:

- A. Guaranteed by manufacturer against defects in materials or workmanship for 3 years.

END OF SECTION 08720

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and 12-inch square Samples.
- B. Fire-Resistance-Rated Assemblies: Products identical to those tested per NFPA 252 for doors and NFPA 257 for window assemblies; both labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- 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: "Glazing Manual" and "Laminated Glass Design Guide."
 - 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
 - 3. SIGMA Publications: SIGMA TM-3000, "Vertical Glazing Guidelines," and SIGMA TB-3001, "Sloped Glazing Guidelines."
 - 4. Flat Glass Manufacturer's Association Publication.
- E. Insulating-Glass Certification Program: Permanently marked with certification label of Insulating Glass Certification Council (IGCC) and/or Insulating Glass Manufacturers Alliance (IGMA).
- F. The following glass manufacturers are approved:
 - 1. Ford Motor Co., Glass Division.
 - 2. Guardian Industries Corp.
 - 3. Libby-Owens-Ford Co.
 - 4. PPG Industries.
- G. Insulating glass shall be manufactured by a member of SIGMA or one of the manufacturers listed above.

PART 2 - PRODUCTS

2.1 GLASS

- A. Glass for UL labeled doors and frames and other places where wire glass is indicated: UL approved for fire-resistant clear polished ¼" clear wire glass with pattern chosen by Owner. Provide samples for Owner selection.
- B. Safety glass: One of the following conforming to the reference listed above and also ANSI Z97.1 and CPSC 16 CFR Part 1201; 42 FR 148:

1. Laminated safety glass for exterior doors, sidelights and transoms within 18" of floor and where indicated on the drawings; ¼" standard 2-ply conforming to reference listed above and ANSI Z97.1 and 16 CFR 1201, Category II.
 2. Tempered glass for exterior doors, sidelights and transoms within 18" of floor and where indicated: ¼" clear tempered polished plate or float glass, conforming to reference listed above and also ANSI Z97.1 1972 or current. Glass shall bear visible, permanent labels.
- C. Wired Glass: ASTM C 1036, Type II, Class 1, Quality q8; Form 1 polished with m1 diamond 0.25 inch thick.
- D. Insulating glass: Sealed edge insulating glass composed of ¼" sheet of clear flat Glasson the inside face and ¼" float, PPG Solex Green, Low-E or equal on the outside and ½" dry airspace. Tempered glass for insulating glass shall conform to paragraph above. Seal shall consist of inner seal of polyisobutylene sealant and outer seal of silicone glazing sealant.
- E. Mirror Glass: ASTM C 1036, Type 1, Class 1, Quality q1 or q2, silver coated per FS DDM411C, 6.0 mm thick, with edges beveled polished.
1. Safety Glass for Mirrors: Fully tempered.
- F. All other glass: Float glass, glazing or commercial quality. If thickness not indicated, it shall be determined from BOCA Basic National Building Code and glass manufacturer's tables for sizes, wind load, and exposures where used. Owner will verify thicknesses.

2.2 FABRICATED GLASS PRODUCTS

- A. Laminated Glass: Two sheets of ¼-inch thick glass, with urethane acrylate resin interlayer. Comply with ASTM C 1172.
- B. Sealed Insulating-Glass Units: Preassembled units complying with ASTM E 2190 for Class CBA units, with two ¼-inch thick sheets of glass separated by a 1/2-inch dehydrated space filled with argon.

2.3 GLAZING

- A. Elastic glazing compound: FS TT-G 410E (1) or as recommended by Flat Glass marketing Association. Owner will choose colors. Provide color samples.
- B. Glazing sealant:
1. For topping: Silicone glazing sealant; FS TT-S-1543A.
 2. For heel bead and metal joints: One part acrylic sealant, FS TT-S-00230.
 3. Color: As chosen by Owner. Provide color samples.
- C. Glazing tape: Polyisobutylene-butyl tape, self shimming.
- D. Interior tape: Closed cell sponge neoprene.
- E. Shims: Silicone with durometer hardness of 40-60.
- F. Setting blocks: Silicone with durometer hardness of 70-90.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with published recommendations of glass product manufacturers and organizations listed above, unless more stringent requirements are indicated. Notify Owner and proceed as directed by Owner.
- B. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- C. Install interior glass with glazing compound or felt.
- D. If glazing gaskets are specified with entrance system, glaze entrance and storefront system according to entrance system manufacturer's recommendations.
- E. Clean and protect glass and plastics as recommended by manufacturer and Flat Glass Marketing Association.

END OF SECTION 08800

SECTION 09260 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Division 6 – Wood and Plastics is made a part of this section.
- C. Division 10 – Specialties is made a part of this section.
- D. Submittals: Product Data, certification stating that all gypsum board products being provided contain no asbestos containing material.
- E. 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.
- F. 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.
- G. Any materials provided and installed to complete the work shall be free of any asbestos, PCB's, lead containing materials, sulfur and any other hazardous materials. MSDS sheets to be provided for all materials prior to acceptance and installation

1.2 PRODUCTS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following
 - 1. Steel Framing and Furring;
 - Gold Bond Building Products Div. National Gypsum Co.
 - Incor, Inc.
 - Marino Industries Corp.
 - United States Gypsum Co.
 - 2. Gypsum Boards and Related Products
 - United States Gypsum Co.
 - Gold Bond Building Products Div., National Gypsum Co.

1.3 METAL FRAMING AND SUPPORTS

- A. Steel Framing Members, General: ASTM C 754.
 - 1. Steel Sheet Components: ASTM C 645, with manufacturer's standard corrosion-resistant zinc coating.

- B. Suspended Ceiling and Soffit Framing:
 - 1. Grid Suspension System for Interior Ceilings: Interlocking, direct-hung system, 15/16" width unless noted otherwise.
- C. Partitions, closet partitions and soffit framing:
 - 1. Studs and Runners: In depth indicated and 0.0179 inch thick, unless otherwise indicated.
 - 2. Flat Strap and Backing: 0.0179 inch thick.
 - 3. Rigid Hat-Shaped Furring Channels: In depth indicated and 0.0179 inch thick.
 - 4. Resilient Furring Channels: 1/2 inch deep, with single- or double-leg configuration.

1.4 PANEL PRODUCTS

- A. Provide in maximum lengths available to minimize end-to-end butt joints and minimize the need for trimming
- B. Gypsum Wallboard: ASTM C 36, in thickness indicated, with manufacturer's standard edges. Regular type, unless otherwise indicated except Type X where required for specific fire-resistance-rated assemblies.
- C. Water-Resistant Gypsum Backing Board: ASTM C 630, in thickness indicated. Regular type, except Type X where required for fire-resistance-rated assemblies. Resists the growth of mold per ASTM G21 with a score of 0 and D 3273 with a score of 10.
- D. Acoustically Enhanced Gypsum Wallboard: 5/8" thick gypsum board consisting of a layer of viscoelastic damping polymer sandwiched between two pieces of high density mold resistant gypsum board, providing constrained layer damping for high STC rated areas. Pass full scale ASTM E90 test procedure.
- E. Glass-Mat, Water-Resistant Gypsum Backing Board: ASTM C 1178, of thickness indicated. Regular type, except Type X where required for fire-resistance-rated assemblies.
 - 1. Product: "Dens-Shield Tile Backer" manufactured by Georgia-Pacific Corp.

1.5 ACCESSORIES

- A. Trim Accessories: ASTM C 1047, formed from galvanized or aluminum-coated steel sheet or rolled zinc. Provide plastic trim accessories at bathrooms with showers
 - 1. Provide corner bead at outside corners, unless otherwise indicated.
 - 2. Provide LC-bead (J-bead) at exposed panel edges.
 - 3. Provide L-bead with tear away strip at dissimilar finishes.
 - 4. Provide control joints where indicated.
- B. Joint-Treatment Materials: ASTM C 475.
 - 1. Joint Tape: Paper, unless otherwise recommended by panel manufacturer.

2. Joint Compounds: Setting-type taping compound and drying-type, ready-mixed, compounds for topping.
- C. Green Glue Noise Proofing Compound: Apply between 1st and 2nd layers of GWB at rate of 2 tubes per 4 x 8 sheet. Contact: Green Glue Sales: 866-435-8893.
- D. Acoustical Sealant for Exposed and Concealed Joints: Reference Section 07920 Joint Sealants.
- E. Sound-Attenuation Blankets: Reference Section 07210 Building Insulation.
- F. Miscellaneous Materials: Auxiliary materials for gypsum board construction that comply with referenced standards.

PART 2 - EXECUTION

2.1 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."
- B. Isolate steel framing from building structure, except at floor, to prevent transfer of loading imposed by structural movement.
- C. Install and finish gypsum panels to comply with ASTM C 840 and GA-216.
 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. Multilayer Fastening Methods: Fasten base layers and face layer separately to supports with screws.
- D. STC-Rated Assemblies: Comply with ASTM C 919 for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies.
- E. Fire-Resistance-Rated Assemblies: Comply with requirements of listed assemblies.
- F. Finishing Gypsum Board Assemblies:
 1. 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.
 2. At concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies, provide Level 1 finish: Embed tape at joints.
 3. At substrates for tile, provide Level 2 finish: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges.
- G. Plaster Repair: At all plaster wall areas that are noted to be patched or repaired, cracked or damaged areas shall be cut out as required and patched with GWB. Joints shall be taped and three coats of joint compound shall be applied. Sand between each coat. Skim coat surrounding area with joint compound as required blending in patch and concealing all other

imperfections. All patched areas shall be review and approved by the Owner prior to applying primer and topcoat.

END OF SECTION 09260

SECTION 09290 - FIBERGLASS COLUMNS

1.0 GENERAL

1.1 DESCRIPTION:

A. Columns shall be DuraCast/DuraLite Fiberglass Columns manufactured by Hartmann-Sanders based on the design of a square fluted column with Tuscan style cap and base.

B. Column design shall have the correct proportions based on Orders of Architecture, except when cut to a specific overall length.

C. DuraCast columns are manufactured from highly advanced fiberglass reinforced polymers (FRP).

D. All DuraCast shafts shall be 100% sanded.

E. All DuraCast shafts shall be classified as NFPA Class A and UBC Class 1, with a smoke density rating below 450 according to ASTM E84-01 testing criteria.

F. Caps shall be Polyurethane.

G. Bases shall be Polyurethane.

H. Plinths shall be Polyurethane.

1.2 SUBMITALS

A. Submit Hartmann-Sanders product data and shop drawings clearly marked to show column requirements.

2.0 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER:

A. First Class Building Products, Inc
3600 Dallas Highway Suite 230-387
Marietta, Georgia 30064
Tel: 770-514-8141 Fax: 770-514-0731

B. Hartmann-Sanders Manufacturing Company
1700 West Grand Avenue
Gadsden, AL 35901
Phone: 800-468-5993
Fax: 256-442-4794

B. Approved Equal.

2.2 MATERIALS

A. All fiberglass columns shall be manufactured from advanced fiberglass reinforced polymers (FRP).

3.0 EXECUTION

3.1 INSTALLATION

A. Follow manufacturer's detailed installation procedures.

1. Determine the position of the plinth by dropping a plumb line from the center of the soffit beam to the floor. Mark this point on the floor with a "X". This mark is where you will center the plinth so that the top of the shaft will align with the soffit.
2. Measure the overall height. Raise the soffit or porch slightly with brace for easy installation of the columns.
3. Trim column shaft on the bottom end only. Trim with an abrasive saw. Finish both top and bottom of shaft with a rasp to ensure an even load distribution around the entire circumference.
4. Slide cap over top of column shaft. Let cap slide down to rest on neck mold temporarily until shaft is correctly positioned. (If installing a square column, slide neck mould over top of shaft to desired location. Fasten neck mould to shaft. Caulk between neck mould and shaft.)
5. Slide base/plinth onto column shaft from bottom.
6. Place column in a vertical position with load centered over column shaft with even distribution around bearing surfaces.
7. If installation requires that column be secured in place prior to bearing load, use small L brackets. Be careful to ensure L brackets do not interfere with seating of cap and base. Note: To secure bracket to column, drill hole in shaft and use through bolts. Do not use screws.
8. Remove brace to allow load to bear on column shaft.
9. Slide cap up to soffit and attach to soffit using corrosion resistant type screws. Attach base/plinth to floor using appropriate fasteners.

10. Caulk between the cap and the soffit, the cap and shaft, and the base and the shaft for a finished appearance.

3.2 PAINTING/FINISHING

A. Make sure all surfaces are clean prior to painting. Use mineral spirits if oil or alkyd products are used. Warm soapy water should be used if latex products are utilized.

B. It is necessary to sand the column and caps and base/plinths prior to priming and painting. Some filling may be required. Note: The surface on polyurethane caps and base/plinths must be thoroughly scuff sanded with 120 grit sand paper and wiped clean prior to priming and painting.

C. Alkyd or oil based primer and paint are recommended. Latex products can be used, but additional sanding is required. Only alkyd or oil based primer and paint must be used on DuraWound columns, caps, and base/plinths.

D. Use a good, high quality exterior paint. At least one coat of primer and two coats of paint should be applied.

E. Follow paint manufacturer's instructions concerning use within temperature ranges for best results.

F. Do not use paint or solvents containing acetone.

3.3 WARRANTY

A. All fiberglass columns and polyurethane, fiberglass components, and decorative capitals have a Limited Lifetime Warranty.

END OF SECTION 09290

SECTION 09641 - LAMINATE FLOORING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Div. 1 – General Requirements is made a part of this section.
- B. Submittals: Product Data and material Samples.

PART 2 - PRODUCTS

A. Laminate Wood Flooring

- 1. Pergo XP Collection
 - a. Color / Finish: from manufactures available line.
 - b. Thickness: 12 mm.
 - c. Width: 7-5/8 inch
 - d. Length: 47-1/2 inch
 - e. Edges: SmartLock patented dual-locking, flueless click joint installation
 - f. Embossed surface with Lustergard Plus surface protection
 - g. 25 year residential warranty
- 2. Bruce Laminate Floors
 - a. Color / Finish: from manufactures available line.
 - b. Thickness: 12 mm.
 - c. Width: 7.32 inch
 - d. Length: 50.59 inch
 - e. Edges: Square Edge / Square Ends
 - f. Bruce Hi-Definition Print / Magnum HDF Core
 - g. 25 year residential warranty
- 3. Approved equal

2.2 ACCESSORY MATERIALS.

- A. Flooring Underlayment: Two in one premium hard surface flooring underlayment required under laminate flooring in accordance with the manufacturer's specification.
- B. Wood Trim: In same species and grade as laminate flooring, unless otherwise indicated.
 - 1. Wood Base: accessory standard.
 - 2. Base Shoe Molding: accessory standard.
 - 3. Threshold: accessory standard.
 - 4. Reducer Strip: accessory standard.

2.3 INSTALLATION

WESLEYAN UNIVERSITY

- A. Comply with flooring manufacturer's written instructions.
- B. Provide expansion space at walls and other obstructions and terminations of flooring in accordance with manufacturer's written instructions.
- C. Felt Underlayment: Required under all laminate flooring in accordance with manufacturer's installation instructions.
- D. Vapor Retarder: Where wood flooring is installed on concrete slabs, install underlayment sheets according to flooring manufacturer's written instructions.
- E. Wood Trim: Nail baseboard to wall and nail shoe molding or other trim to baseboard; do not nail to flooring. Coordinate finish of paint or stain to wall trim and shoe molding with Owner.

END OF SECTION 09640

SECTION 09642 - WOOD FLOOR REFINISHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes

1. Finishing requirements for the following types of wood floors.
 - a. New and existing wood strip flooring.
 - b. New and existing wood parquet flooring.

1.2 SECTION REQUIREMENTS

- A. The Conditions state that the Contract Documents are complementary.
- B. Temporary facilities and controls are specified in Section 01500. Cooperate in ensuring adequate protection.
- C. General material, equipment, and workmanship standards are specified in Section 01600.
- D. Painting is specified in Section 09910.

1.3 SUBMITTALS

- A. Submit product data on finishing products and systems.
- B. Submit record of moisture readings.

1.4 ENVIRONMENTAL CONDITIONS

- A. At time of wood flooring refinishing, building shall be dry and closed in. Temperature during and after installation shall be between 70° and 90° F. Flooring moisture content at time of installation shall have reached equilibrium. Take moisture readings of typical wood flooring and submit record for Architect's review.

PART 2 - PRODUCTS

2.1 SEALING AND FINISHING MATERIALS

- A. Urethane Finish System; Acceptable Manufacturers:
 1. LEED EQc4: Low-Emitting Materials:

- a. Finish must not exceed the VOC and chemical component limits set forth by Green Seal's Standard GS11.
2. Emulsion by Basics; gloss or semi-gloss finish as specified by location.
3. Waterborne Urethane by Benjamin Moore; gloss or semi-gloss finish as specified by location.
- B. Finish Coats: Formulated for multicoat application on wood flooring. Apply three coats on new wood floor installations or existing wood floors that are screened or sanded in accordance with manufacturer's instructions, buffing after each coat.
 1. Allow finish to cure for 7 days prior to subjecting to traffic.
- C. Apply three coats minimum on existing wood floors that are screened in accordance with manufacturer's instructions, buffing after each coat.
 1. Allow finish to cure for 7 days prior to subjecting to traffic.
- D. Stain: Penetrating type which is nonfading wood stain of the color required to match Owner's selection from manufacturer's samples.
 1. LEED EQc4: Low Emitting Materials
 2. Stain must not exceed the VOC and chemical component limits must not exceed the Green Seal Standard GS11 requirements.
- E. Wood Filler: Formulated to fill and repair seams, defects, and open-grain hardwood floors; compatible with finish system components and recommended by filler and finish manufacturers for use indicated. If required to match approved samples, provide pigmented filler.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine wood flooring to be refinished. Report defects which are likely to have adverse effects on flooring to Owner in writing.
- B. Remove surface mounted fasteners, other residual remains of previous floor coverings over original wood flooring.
- C. Replace missing floor boards salvaged material matching original patterns, species, and sizes. Conceal fastenings as required. Refasten loose boards where necessary. Plug abandoned holes where piping or conduit was removed. Apply wood filler if required to repair minor defects.
- D. Sand/screen flooring level and smooth. Finish sanding with #120 grit. Vacuum floor, and request inspection by Architect. Do not proceed without Owner's written approval.
- E. If finishing is delayed after sanding is complete, cover sanded/screened and prepared floors with 1/8" masonite hardboard protection course, with joints and edges taped until all other trades have completed work in the spaces and they can be safely finished for Owner's use.

3.2 SANDING AND FINISHING

- A. Sand flooring with drum sander, edger, butter and hand scraper.

- B. Use coarse, medium and fine grade sandpaper.
- C. After sanding with drum sander, buff entire floor using 100 grit screen back or equal grit sandpaper, with a heavy duty buffing machine. Screen with 120 to 150 grit screen.
- D. Vacuum or tack floor before first coat of finish.
- E. Floor shall present a smooth surface without drum stop marks, gouges, streaks or shiners.
- F. Apply stain if needed. Owner to select color from manufacturer's samples.
- G. Apply floor sealer (1 coat) in accordance with manufacturer's instructions, including machine buffing.
- H. Apply floor finish in 3 coats in accordance with manufacturer's instructions, buffing after each coat.
- I. Allow finish to cure for 7 days prior to subjecting to traffic.
- J. Clean up all unused materials and debris and remove same from the premises.

3.3 SCREENING AND FINISHING

- A. Machine-screen entire floor area to remove all surface dirt, grease, wax, etc. Follow 'Urethane Finish System' surface preparation requirements. Vacuum and tack with a clean cloth immediately before applying finish.
- B. Apply stain if needed to match existing floor.
- C. Apply floor finish components in two coats, minimum, and follow all recommendations by finish manufacturer for application indicated.

3.4 PROTECTION

- A. Protect wood flooring during remainder of construction period to allow finish to cure and to ensure that flooring and finish are without damage or deterioration at time of project turnover.
- B. Clean up all unused materials and debris and remove same from the premises.

END OF SECTION 09640

SECTION 09651 - RESILIENT FLOOR TILE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1:- General Requirements is made a part of this section.
- B. Other Division 9 sections for floor finishes related to this section but not the work of this section.
- C. Division 3 Concrete; not the work of this section.
- D. Division 6 Wood and Plastics; not the work of this section.
- E. Division 7 Thermal and Moisture Protection; not the work of this section.
- F. Submittals: Product Data and Samples.
- G. Fire Test Response: Resilient tile has critical radiant flux classification of Class I, not less than 0.45 W/sq. cm per ASTM E 648.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION FLOOR TILE

- A. Products:
 - 1. Contractor shall provide pricing for StoneWalk and Essentials flooring.
 - 2. The Mohawk Group StoneWalk Non-PVC Tile:
 - a. Color: Provide manufacturer's color samples.
 - b. ASTM F 1066, Class 2 (modified for NONE vinyl compound)
 - c. Thickness: 0.080"
 - d. Size: 12" x 12"
 - e. VOC: None
 - f. Flame Development: ASTM E 84, Class 1.
 - g. Smoke Development: ASTM E 662, Class 1.
 - h. Static Load Limit: ASTM F 970-00, 2000 PSI.
 - i. Resistance to chemicals: ASTM F 925.
 - j. Limited Wear Warranty: 5 Years.
 - 3. Mannington Commercial Essentials Vinyl Composition Tile with Recycled Vinyl Content:
 - a. Color and Pattern: #137 Sand Drift (Submit manufacturers standard color selection for review and final approval).
 - b. ASTM F 1066, Class 2 (through-pattern tile).
 - c. Thickness: 0.125 inch.
 - d. Size: 12" x 12"
 - 4. Armstrong Commercial Flooring; Migrations with BioStride BioBased Tile
 - a. Color: Color selected from the range currently available from Armstrong World Industries, Inc.
 - b. Thickness: Having a nominal total thickness of 0.125".

- c. Size: 12 in. x 12 in. composed of polyester resin binder, fillers and pigments with colors and texture dispersed uniformly throughout its thickness.
 - d. ASTM F 1066, Class 2 through-pattern
 - e. Thickness: 0.125 inch.
 - f. Size: 12" x 12"
5. Approved Equal.
- B. Trowelable Leveling and Patching Compounds: Provide USGBC approved latex-modified, portland cement- or blended hydraulic cement-based formulation provided by flooring manufacturer for applications indicated.
 - C. Adhesives: Provide USGBC approved water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
 - D. Provide transition/reducing strips tapered to meet abutting materials.
 - E. Metal Edge Strips: Extruded aluminum in mill finish unless otherwise specified. Provide in maximum available lengths to minimize joints and of required thickness to protect exposed edges of the flooring. Use butt-type metal edge strips for concealed anchorage, or overlap-type metal edge strips for exposed anchorage.
 - F. Thresholds: Wood, metal, and/or marble to match existing or as directed by Owner.
 - G. Sealer and Wax: Contractor to submit cut sheets of Zinc Free Floor Finish by EcoLab, Inc.

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. Ensure that surface is smooth, level and free from defects. Flash patch substrate as required to ensure a smooth, level surface.
- B. Lay out tiles so tile widths at opposite edges of room are equal and are at least one-half of a tile.
- C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged. Lay tiles as directed by the owner either with grain running in one direction or in basket-weave pattern with grain direction alternating in adjacent tiles. Obtain owner approval prior to the start of work.

3.2 CLEANING AND PROTECTION

- A. Prior to cleaning and sealing newly installed floors, ensure that adhesives have cured properly in accordance with the manufacturer's written instructions.
- B. Seal and wax floors with three (3) coats Zinc Free Floor Finish by EcoLab, Inc.

END OF SECTION 09651

SECTION 09652 - SHEET VINYL FLOOR COVERINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.

1.2 Submittals: Product Data and Samples.

PART 2 - PRODUCTS

2.1 SHEET VINYL FLOOR COVERING

A. Products:

1. **Mannington Realities Brazilian Cherry – Bedrooms**

- a. Product Number: 5634
- b. Colorway Name: Natural
- c. Pattern Type: Wood
- d. Pattern Scale: Small
- e. Gloss Level: Low
- f. Nature Form: Yes
- g. Guardian Protection: Yes
- h. Never Yellow: Yes
- i. Recycled Content: Yes
- j. FloorScore Certified: Yes
- k. Installation Type: Full spread, Loose lay (no glue) or Perimeter (glue only perimeter)

2. **Mannington Jumpstart Montana Ridge – Kitchens**

- a. Product Number: 71101
- b. Colorway Name: Porcelain
- c. Pattern Scale: Medium
- d. Repeat Length: 36
- e. Repeat Width: 36
- f. Nature Form: Yes
- g. Never Yellow: Yes
- h. Guardian Protection: Yes
- i. Scratchresist: Yes
- j. Recycled Content: Yes
- k. FloorScore Certified: Yes
- l. Installation Type: Full spread, Loose lay (no glue) or Perimeter (glue only perimeter)

3. **Mannington Aurora Costa Maya – Bathrooms**

- a. Product Number: 41244
- b. Colorway Name: Pumice
- c. Pattern Scale: Medium
- d. Repeat Length: 36
- e. Repeat Width: 36
- f. Nature Form: Yes
- g. Never Yellow: Yes
- h. Scratchresist: Yes

- i. Recycled Content: Yes
- j. FloorScore Certified: Yes
- k. Installation Type: Full spread, Loose lay (no glue) or Perimeter (glue only perimeter)

4. Approved Equal.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Low VOC, solvent free adhesive. Latex-modified, portland cement- or blended hydraulic cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- B. Adhesives: Low VOC, solvent free adhesive. Water-resistant type recommended by manufacturer to suit sheet vinyl floor covering and substrate conditions indicated
- C. Metal Edge Strips Thresholds: Extruded aluminum in maximum available lengths to minimize joints.

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. Flash patch all cracks, voids, seams and depressions as required to obtain a smooth, even substrate.
- C. Laying the underlayment panels should begin in one corner of the room. Lay all underlayment panels in the same direction. Underlayment panel edges and subfloor edges should be offset at least 8". A space of 1/4" to 3/8" shall be left between the panels and the wall around the perimeter of the room. Stagger panel joints so that four corners do not meet. Cross joints should be staggered at least 16". The panel edges shall be lightly butted together.
- D. New underlayment should not be installed over heavily cushioned flooring. These may not provide a firm base for underlayment board application resulting in an up and down or scissoring action at the seams. Telegraphing of underlayment joints and nail pops may also occur.
- E. Nails: Cement coated or resin coated fasteners can stain resilient flooring. Use non-coated ring-shank or screw type underlay flooring nails. The length of the nail shall not exceed the total thickness of the subfloor and underlayment. Space nails 2" to 4" on center at panel edges and 6" on center throughout the field.
- F. Staples: Stapling underlayment panels using a staple with a divergent chisel point is recommended. Staples should be spaced 1"-2" along the edge and 3"-4" on center throughout the field.
- G. Begin fastening at one corner of underlayment panels and work diagonally across panels (fan nail). Fasteners shall be set flush or just slightly below the surface of the underlayment.

- H. The underlayment must be dry, clean, smooth, level and structurally sound. The underlayment shall be swept and/or vacuumed to remove any dust and debris. Any surface materials present such as paint, wax, grease, oil, adhesive residues, crayon, pen marking, etc. that may prevent a proper bond or migrate to the surface of the flooring causing discoloration, must be removed.
- I. Fill and level underlayment joints and all other irregularities with a high quality, non-shrinking, latex fortified, hydraulic cement patching compound.
- J. Note: Tarkett does not recommend or warrant the use of any products containing gypsum as a satisfactory patching compound for the installation of Tarkett resilient floorings. Tarkett will not accept responsibility for flooring failures related to the use of gypsum type patching compounds.
- K. Maintain uniformity of sheet vinyl floor covering direction, and match edges for color shading at seams.
- L. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in substrates.
- M. Installation shall meet or exceed all manufacturers' requirements.

END OF SECTION 09652

SECTION 09653 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data and Samples.

PART 2 - PRODUCTS

2.1 WALL BASE

A. Products:

- 1. Johnsonite Rubber Wall Base (DC):
 - a. Color and Pattern: Provide sample of manufacturer's standard colors for final selection and approval.
 - b. ASTM F-1861, Type TP, Group 1 (solid) Standard Specification for Resilient Wall Base
 - c. Style: Cove (with top-set toe) unless otherwise noted as straight
 - d. Minimum Thickness: 0.125 inch.
 - e. Height: 4 inches unless otherwise noted as 6 inches
 - f. Lengths:
 - 1) 4" Height: Cut lengths 48 inches long or 120 foot coils.
 - 2) 6" Height: Packaged in 100' lengths.
 - g. Inside and outside corners with 4" returns.
 - h. Product Performance and Technical Data
 - 1) Hardness: ASTM D 2240: 85 Shore A.
 - 2) Flexibility: Will not crack, break, or show any signs of fatigue when bent around a 1/4" diameter cylinder.
 - 3) Fire Resistance: ASTM E 84/NFPA 255 (Flame/Smoke) – Class A, < 450 and ASTM E 648 (NFPA 253): Critical Radiant Flux – Class 1.
- 2. Johnsonite Vinyl Wall Base (CB or CBT for toeless):
 - a. Color and Pattern: Provide sample of manufacturer's standard colors for final selection and approval.
 - b. ASTM F-1861, Type TP, Group 1 (solid) Standard Specification for Resilient Wall Base
 - c. Style: Cove (with top-set toe) unless otherwise noted as straight
 - d. Minimum Thickness: 0.125 inch.
 - e. Height: 4 inches unless otherwise noted as 6 inches
 - f. Lengths:
 - 1) 4" Height: Cut lengths 48 inches long or 120 foot coils.
 - 2) 6" Height: Packaged in 100' lengths.
 - g. Inside and outside corners with 4" returns.

- h. Product Performance and Technical Data
 - 1) Hardness: ASTM D 2240: 90 Shore A.
 - 2) Flexibility: Will not crack, break, or show any signs of fatigue when bent around a 1/4" diameter cylinder.
 - 3) Fire Resistance: 2ASTM E 84/NFPA 255 (Flame/Smoke) – Class B, < 450 and ASTM E 648 (NFPA 253): Critical Radiant Flux – Class 1.

2.2 RESILIENT STAIR ACCESSORIES

A. Products:

- 1. Johnsonite Vinyl Stair Treads

B. Color and Pattern: VIHT (Visually Impaired) - Safe-T-Rib Vinyl Stair Treads, 2" hinged square nose (Sq) configuration or 1-5/8" diameter round nose (Rd) configuration 1/4" to 1/8" tapered 12-1/4" tread depth, 2" wide (VI) contrasting color grit tape insert. Color shall be black unless specified otherwise.

- 1. Provide samples of manufacturer's standard colors for final approval.
- 2. Size: Lengths and depths to fit each stair tread in one piece or as specified.

C. Product Performance and Technical Data

- 1. Hardness: ASTM D 2240 - Not less than 85 Shore A.
- 2. Abrasion Resistance: ASTM D 3389 - 0.22 mg/cycle.
- 3. Slip Resistance: ASTM D 2047 - Exceeds Federal.
- 4. Standards and ADA recommendations of .6 for flat surfaces.
- 5. Fire Resistance: ASTM E 648/NFPA 253 (Critical Radiant Flux) - Class 1.

2.3 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-based 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.

- D. Sand stair treads and risers as required removing the existing surface finish. Refinish treads and risers as specified prior to installing vinyl stair treads. Obtain owner approval of refinished treads and risers prior to vinyl tread installation.
- E. Install reducer strips at edges of floor coverings that would otherwise be exposed.

END OF SECTION 09653

SECTION 09680 - CARPET

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1: General Requirements are apart of this section.
- B. Submittals: Product Data, Samples.
- C. Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."

PART 2 - PRODUCTS

2.1 Vestibule / Entry Carpet

- A. Product in Woodframe Houses (unless otherwise noted on the drawings by Owner):
 - 1. **Matsinc.** Roll Goods 'Berber.' 800-628-7462 (www.matsinc.com)
 - a. Color: Charcoal #07
 - b. Transition strip: Ramp-flex transition strips #NOCRS as manufactured by **Matsinc.**
 - c. Fiber Content: 100% solution dyed UV stabilized polypropylene fiber
 - d. Total Weight: 78 oz for finished carpet.
 - e. Primary Backing: high density rubber.
 - f. Width: 6'-7" & 13'-2" (Order width based on individual project requirements).
 - g. Recycled Content: 15% post-consumer
- B. Products in Administrative, Academic, Dormitories and Program Houses:
 - 1. InterfaceFLOR Entry Level
 - a. Color: Provide Owner with color samples for selection.
 - b. Modular: 50 cm x 50 cm
 - c. Backing System: GlasBac Tile
 - d. Yarn System: Invista Type 6,6 Nylon with InterfaceFLOR approved Type 6,6 Nylon
 - e. Color System: 100% Solution Dye
 - f. Construction: Tufted Textured Loop
 - g. Lifetime Antimicrobial: intersept
 - h. Soil/Stain Protection: Protekt² with Zonyl 8779 Fluorochemical
 - i. Yarn Weight: 28 oz
 - j. Total Recycled Content: 40% - 43%
 - k. CRI Green Label Plus: GLP8020
 - l. Installation Method: Non-directional
 - 2. Lees Step Up DD763
 - a. Gauge: 5/32"
 - b. Face Yarn: Fortis Nylon 6,6 scraper yarn
 - c. Dye System: Yarn dyed
 - d. Fiber Technology: Sentry Soil Protection

- e. Backing Material: Fiberglass Reinforced Thermoplastic
- f. Face Yarn Weight; 38 oz/sy
- g. Modular: 24" x 24"
- h. Installation Method: Quarter Turn or Monolithic
- i. IAQ Green Label Plus: 1098

2.2 COMMON AREA CARPET

A. Products:

- 1. InterfaceFlor Carpet Squares
- 2. Shaw Broadloom
- 3. Approved Equal (Carpet shall be constructed of first quality materials and tested to comply fully with the requirements and be certified by the CRI Green Label indoor air quality carpet testing program for volatile organic compounds. The commercial carpet must contain at least 25% recycled content and be recycled).

B. Yarn Weight: 28 oz. – 32 oz.

C. Broadloom Surface Appearance: Textured Heathered Loop

D. Carpet Square Surface Appearance: Tufted Cut and Loop

E. Broadloom Carpet Primary Backing: Woven Polypropylene

F. Broadloom Carpet Secondary Backing: Woven Polypropylene

G. Carpet Square Backing: Glasbac RE

H. Broadloom Width: 12'

I. Carpet Squares: Per selected Product.

2.3 CARPET CUSHION (compatible with double glue installation)

A. Traffic Classification: CCC Class II, heavy traffic.

B. Fiber Cushion:

- 1. Resinated recycled textile.
- 2. Weight: 32 oz./sq. yd.
- 3. Submit compatible foam cushion to Owner for approval

PART 3 - EXECUTION

3.1 INSTALLATION

WESLEYAN UNIVERSITY

- A. Vestibule/Entry carpets to be installed at all main entrances, vestibules and halls as noted for each project scope. Common Area carpet shall be installed at all common areas as noted on the contract drawings and as outlined in each project scope.
- B. Comply with CRI 104, Section 8:
 - 1. Direct Glue-Down method for vestibule entry locations.
 - 2. Double Glue-Down method for common area locations.
- C. Use manufacturers approved adhesives for carpet and transition strips. TacTiles to be used for InterfaceFlor carpet squares.
- D. Install transition strips at the end of the carpet runs and at each doorway or entryway location.
- E. Maintain uniformity of carpet direction and lay of pile. At doorways, center seams or transition strips under door in closed position.
- F. Install pattern parallel to walls and borders.

END OF SECTION 09680

SECTION 09681 – CARPET CLEANING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Cleaning Solution Product Data

PART 2 - PRODUCTS

2.1 CARPET CLEANING SOLUTION

- A. Products:
 - 1. Cleaning product shall be Revitalize Carpet Shampoo “Green” cleaning product by EcoLab.
 - 2. Proposed cleaning solution and procedure shall be submitted to the Owner for review and approval.

PART 3 - EXECUTION

3.1 CLEANING METHODS

- A. Remove all moveable items and furnishings from room to perform cleaning. Ensure items are secure. Reinstall all items after carpet has dried.
- B. Vacuum room prior to cleaning.
- C. Inspect existing carpet and remove stains by applying Revitalize Carpet Shampoo “Green” cleaning agent directly to the stained area. Hot water extraction methods shall be used to remove the stains. Retreat as required to remove stain.
- D. Hot water extraction cleaning methods shall be employed to clean the carpets noted. Revitalize Carpet and Upholstery Extraction Cleaner shall be applied per manufacturer’s recommendations. Extraction equipment shall be portable.
- E. Upon completion of the cleaning methods noted above, ensure that the carpet has a clean, uniform appearance. Retreat stains if required.

END OF SECTION 09681

SECTION 09770 – SPECIAL WALL SURFACES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data

PART 2 - PRODUCTS

2.1 FIBERGLASS REINFORCED PLASTIC (FRP) PANELS

- A. Products:
 - 1. Kemlite Company, Inc. Glasbord-FSI panels or approved equal
- B. Size: Manufacturer's standard sizes. Sizes shall be selected based on individual project requirements as required to minimize joints.
- C. Finish: Smooth
- D. Nominal Panel Thickness: 0.075"
- E. Color: White
- F. Flame Spread / Smoke Development Rating: Class A
- G. Attachment Devices:
 - 1. Kemlite Titebond FRP adhesive
 - 2. Nylon drive rivets
- H. Accessories:
 - 1. Vinyl accessory moldings for installing FRP.

2.2 FABRICATION

- A. Fabricate panels with a continuous laminating process to obtain a smooth finish and continuous color throughout.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Patch and repair any wall or ceiling section that is uneven and ensure that the wall or ceiling surfaces are structurally sound prior to applying the FRP panels.
- B. Prepare any repaired or patched wall/ceiling surface in accordance with the manufacturer's recommendation.
- C. Install panels level and aligned at top and bottom, vertical and plumb.

- D. FRP panels shall be installed and fastened in accordance with the manufacturers specifications.
 - E. Use vinyl accessory moldings to obtain a finished look and proper top and corner terminations.
- END OF SECTION 09770

SECTION 09910 - PAINTING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 – General Requirements is made a part of this section.
- B. House / Village Color Schemes study entitled “Exterior Paint Study and Building Analysis – The Village at Wesleyan University” prepared by Elizabeth Randall dated April 20, 1998 is made a part of this section and is available for review at the Office of Construction Services, 170 Long Lane, Middletown, CT 06459.
- C. Summary: Paint exposed surfaces, new and existing, unless otherwise indicated.
 - 1. Do not paint prefinished items, items with an integral finish, operating parts, and labels, unless otherwise indicated.
- D. Use KILZ general purpose primer to cover any stains or surface imperfections that may bleed through the finish coat.
- E. Submittals: Submit paint finish schedule for each project, color samples and product cut sheets to Owner prior to the start of work.
- F. Mockups: Full-coat finish sample of each type of coating, color, and substrate, applied where directed.
- G. Obtain block fillers and primers for each coating system from same manufacturer as finish coats.
- H. 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:

Note: Sherwin William Supplier – National Paint & Wallpaper, 32 Washington Street, Middletown, CT, Ph. 860-346-7705 or approved equal

- 1. Sherwin Williams (Interior)
 - a. Promar 200 Interior Latex Wall Primer
 - b. Promar 200 (Flat, Eggshell, Semi-gloss – As Noted)
 - c. Builder’s Solution Interior Matte Latex
- 2. Muralo
 - a. Superfinish Premium Acrylic Ceramic (Eggshell, Semi-gloss – As Noted)
- 3. KILZ® (Interior / Exterior)

- a. General Purpose Primer
 4. Zinsser (Exterior)
 - a. Peel Stop® Clear Binding Primer
 5. Sherwin Williams (Exterior)
 - a. Duration Satin: house field
 - b. Duration Gloss: doors/trim
 - c. DTM: metals
 6. Benjamin Moore (Exterior)
 - a. Fresh Start® All-Purpose 100% Acrylic Primer 023 (tinted to match approximate shade of topcoat color).
 - b. MoorGard® N103 – 100% Acrylic Low Lustre Latex House Paint (field).
 - c. Moorcraft® Super Spec Latex House & Trim Paint 170 (trim).
 - d. DTM-M04, DTM-M29, DTM-M28 based on finish selected.
 7. Colors: As selected by the Owner.
- B. Material Compatibility: Provide materials that are compatible with one another and with substrates.
- C. Material Quality: Manufacturer's best-quality paint material of coating types specified that are formulated and recommended by manufacturer for application indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove hardware, lighting fixtures, wall plates, 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. Contractor shall assume that all paint contains lead and shall abide by all local, state, federal and OSHA guidelines and shall meet or exceed Wesleyan University requirements outlined in the project manual.
- C. Clean and prepare all surfaces in an area before beginning painting in that area. Cleaning solution shall be submitted to the Owner for approval prior to the start of work. Schedule painting so cleaning operations will not damage newly painted surfaces. Surfaces must be clean and free of grease, wax, mold and mildew. Remove excessive chalk and loose or scaling paint. Glossy surfaces must be dulled. Unweathered areas such as eaves, ceilings, and overhangs should be washed with an environmentally friendly detergent solution and/or rinsed to remove contaminants that can interfere with proper adhesion. Wait a minimum of three days prior to applying paint products to ensure that all surfaces are dry and free of moisture. For metal surfaces, remove rust. Wipe down with paint thinner to remove surface oils. Scrape, sand and remove old paint. Wear a NIOSH approved respirator to control dust exposure. Carefully clean up with a HEPA vacuum and a wet mop.
- D. Upon completing all required prep work, contact Owner to review surfaces prior to applying paint products. Provide additional prep work as required based on review comments from Owner.

3.2 APPLICATION

- A. Apply coatings by brush, roller, spray or other applicators according to coating 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. Pigmented (Opaque) Finishes: Completely cover surfaces to provide a smooth, opaque surface of uniform appearance. Provide a finish free of cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections.
- C. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

3.3 EXTERIOR PAINT APPLICATION SCHEDULE

- A. Concrete, Stucco, and Masonry:
 - 1. Low-Luster Acrylic: One coat Peel Stop® Clear Binding Primer, one coat Fresh Start® All-Purpose 100% Acrylic Primer 023 (tinted to match approximate shade of topcoat color), one coat MoorGard® N103 – 100% Acrylic Low Lustre Latex House Paint..
 - 2. Semi gloss, Acrylic Enamel: **Primer:** MOORE’S® Masonry Sealer (C077) or (066)
Finish: 2 coats AURA® Waterborne Exterior Paint Semi Gloss Finish (632).
- B. Concrete Masonry Units:
 - 1. Low-Luster Acrylic: One coat Peel Stop® Clear Binding Primer, one coat Fresh Start® All-Purpose 100% Acrylic Primer 023 (tinted to match approximate shade of topcoat color), one coat MoorGard® N103 – 100% Acrylic Low Lustre Latex House Paint.
 - 2. Semi gloss, Acrylic Enamel: **Primer:** MOORE’S® Masonry Sealer (C077) or (066)
Finish: 2 coats AURA® Waterborne Exterior Paint Semi Gloss Finish (632).
- C. Student Woodframe House Standards:
 - 1. Doors: Color to match BM Cottage Red
 - 2. Trim/Columns/Gables/Soffits: Color to Match BM Navajo White
 - 3. Porch Ceilings: Color to match BM April Sky
 - 4. Basement security straps / foundations: Color to match BM Tudor Brown.
 - 5. Metal Basement Hatchways: DTM; Color to match BM Tudor Brown
- D. Wood Siding, Shakes:
 - 1. Satin Acrylic: One coat Peel Stop® Clear Binding Primer, one coat Duration – 100% Acrylic Satin Latex House Paint (prime as required)
 - 2. Low-Luster Acrylic: One coat Peel Stop® Clear Binding Primer, one coat Fresh Start® All-Purpose 100% Acrylic Primer 023 (tinted to match approximate shade of topcoat color), one coat MoorGard® N103 – 100% Acrylic Low Lustre Latex House Paint.
 - 3. Where wood siding, shakes are stained, coordinate with Owner materials to be used. In all cases, multiple coats of finish will be required.

- E. Wood Trim:
1. Gloss Acrylic: One coat Peel Stop® Clear Binding Primer, one coat Duration – 100% Acrylic Satin Latex House Paint (prime as required)
 2. Semi gloss, Acrylic Enamel: One coat Peel Stop® Clear Binding Primer, one coat Fresh Start® All-Purpose 100% Acrylic Primer 023 (tinted to match approximate shade of topcoat color), one coat Moorcraft® Super Spec Latex House & Trim Paint 170.
- F. Exterior Doors:
1. Gloss Acrylic: One coat Peel Stop® Clear Binding Primer, one coat Duration – 100% Acrylic Gloss Latex House Paint (prime as required)
 2. Semi gloss, Acrylic Enamel: One coat Peel Stop® Clear Binding Primer, One coat Fresh Start® All-Purpose 100% Acrylic Primer 023 (tinted to match approximate shade of topcoat color), one coat Moorcraft® Super Spec Latex House & Trim Paint 170.
- G. Exterior Wood Decks/Porches:
1. Benjamin Moore Floor and Deck Enamel. Apply two (2) coats. Provide manufacturer's standard color options.
- H. Exterior Wood Finishes:
1. PolyWhey™ Exterior Clear Wood Finish: Two coats.
- I. Ferrous Metal:
1. Low-Luster Acrylic: Two coats over rust-inhibitive primer.
 2. Semi gloss, Acrylic Enamel: Two coats over rust-inhibitive primer.
 3. Full-Gloss, Alkyd Enamel: Two coats over rust-inhibitive primer.
- J. Zinc-Coated Metal:
1. Low-Luster Acrylic: Two coats over galvanized metal primer.
 2. Semi gloss, Acrylic Enamel: Two coats over galvanized metal primer.
 3. Full-Gloss, Alkyd Enamel: Two coats over galvanized metal primer.
- K. Aluminum:
1. Semi gloss, Acrylic Enamel: Two coats over primer.
 2. Full-Gloss, Alkyd Enamel: Two coats over primer.
- L. Center for the Arts
1. Exterior Metal Railings
 - a. Off-white oil gloss used for exterior metal surfaces such as railings. Pittsburgh base # 54-410 w/ the colorants B-1, C-1Y4, L-16, M-6
- M. Van Vleck Observatory Domes
1. Low-Luster Acrylic: One coat IronClad® Latex Low Lustre Metal & Wood Enamel 363/C363. Self priming. Apply two (2) coats. Provide standard color options.

3.4 INTERIOR PAINT APPLICATION SCHEDULE

- A. Concrete and Masonry (Other Than Concrete Unit Masonry):
 - 1. Flat Acrylic: Two coats over primer.
 - 2. Low-Luster, Acrylic Enamel: Two coats over primer.
 - 3. Semi gloss, Alkyd Enamel: Two coats over primer.
- B. Concrete Masonry Units:
 - 1. Flat Acrylic: Two coats over block filler.
 - 2. Semi gloss, Acrylic Enamel: One coat over block filler.
- C. New Gypsum Board:
 - 1. Flat Acrylic: Two coats over primer.
 - 2. Eggshell Acrylic: Two coats over primer.
 - 3. Semi gloss, Acrylic: Two coats over primer.
- D. Existing Gypsum Board:
 - 1. Flat Acrylic: Two top coats, patch and prime as required.
 - 2. Eggshell Acrylic: Two top coats, patch and prime as required.
 - 3. Semi gloss, Acrylic: Two top coat, patch and prime as required.
- E. Wood Frame Standards – Sherwin Williams Promar 200 #2532; Submit paint finish schedule for each project, color samples and product cut sheets to Owner prior to the start of work. Where specifically noted; provide Sherwin Williams Builder’s Solution interior matte latex-reference the drawings.
 - 1. Flat Acrylic (Ceilings): Two topcoats for existing ceilings – patch and spot prime as required. Two top coats over 100% primer for new ceilings. Color: White
 - 2. Eggshell Acrylic/Low Luster (all rooms except Kitchen and Bathrooms): Two topcoats for existing ceilings and walls – patch and spot prime as required. Two top coats over 100% primer for new ceilings and walls.
 - 3. Semi gloss Acrylic (Kitchens & Bathrooms): Two topcoats for existing ceilings and walls – patch and spot prime as required. Two top coats over 100% primer for new ceilings and walls.
 - 4. Semi gloss Acrylic (Trim & Doors): Two topcoats for existing trim and doors – patch and spot prime as required. Two topcoats over 100% primer for new trim and doors.
- F. Kitchen Cabinets: White, Satin Finish, PPG BREAKTHROUGH:
- G. Sprinkler Pipe:
 - 1. Two top coats over primer

- H. Existing Plaster:
 - 1. Flat Acrylic: Two top coats, spot prime as required.
 - 2. Eggshell / Velvet: Two top coats, spot prime as required.
 - 3. Semi gloss, Acrylic Enamel: Two top coats, spot prime as required.
- I. New Woodwork and Hardboard:
 - 1. Semi gloss Acrylic Enamel: Two coats over primer.
- J. Existing Wood Floors:
 - 1. Semi-gloss finishes: Vermont Natural Coatings PolyWhey Floor Finish: Two finish coats.
 - 2. Satin finishes: Vermont Natural Coatings PolyWhey Floor Finish: Two finish coats.
- K. Existing Woodwork and Hardboard:
 - 1. Semi gloss Acrylic Enamel: Two finish coats, spot prime as required.
- L. Stained Woodwork:
 - 1. Alkyd-Based, Satin Varnish: Two coats over sealer and wood stain.
 - 2. Waterborne, Satin Varnish: Two coats over sealer and waterborne wood stain.
 - 3. Waterborne, Full-Gloss Varnish: Two coats over sealer and wood stain.
 - 4. Alkyd-Based Stain, Wax-Polished Finish: Two coats paste wax over sealer and wood stain.
- M. Natural-Finish Woodwork:
 - 1. Alkyd-Based, Satin Varnish: Two coats over sealer.
 - 2. Waterborne, Satin Varnish: Two coats over sealer.
 - 3. Waterborne, Full-Gloss Varnish: Two coats over sealer.
 - 4. Wax-Polished Finish: Two coats paste wax over sealer.
- N. Ferrous Metal:
 - 1. Flat Acrylic: One coat over ferrous metal primer.
 - 2. Semi gloss, Acrylic Enamel: One coat over ferrous metal primer.
 - 3. Full-Gloss, Alkyd Enamel: One coat over ferrous metal primer.
- O. Zinc-Coated Metal:
 - 1. Flat Acrylic: One coat over galvanized metal primer.
 - 2. Semi gloss, Acrylic Enamel: One coat over galvanized metal primer.
 - 3. Semi gloss, Alkyd Enamel: One coat over galvanized metal primer.

P. Center for the Arts

1. Interior Walls

- a. Interior off-white latex (eggshell finish) used on sheet-rocked walls & interior non-metal surfaces. Pittsburgh base is # 6-411 w/ L-24, C-16, B-4, M-2, W-1Y (based on mixing one gallon). Two coats, patch and spot prime as required.

2. Interior Metal Surfaces:

- a. Off-white acrylic/latex semi-gloss used for the interior doors & metal surfaces. Pittsburgh base is Pit-Tech DTM w/ the following colorants: B10, C-1Y4, L-16, M-6. Two coats.

3. Exterior Metal Surfaces

- a. Off-white acrylic/latex gloss used for the exterior railing surfaces. Pittsburgh base is Pit-Tech DTM w/ the following colorants: B10, C-1Y4, L-16, M-6. Two coats.

4. Exterior Metal Doors and Metal Enclosures:

- a. Pittsburgh base # 54-200 & the colorants are Pittsburgh standard custom formula # 4756. Two coats.

END OF SECTION 09910

SECTION 10801 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, No. 4 finish (polished), 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.
- B. Sheet Steel: ASTM A 1008/A 1008M, 0.0359-inch (0.9-mm) minimum nominal thickness.
- C. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- D. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- E. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.
- F. Keys: Provide universal keys for internal access to accessories for servicing and re-supplying. Provide minimum of [six] keys to Owner's representative.

2.2 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
 - 1. Basco
 - 2. Bradley
 - 3. Parker
 - 4. Bobrick
 - 5. American Specialties
 - 6. Moen
 - 7. Décor Bathware
 - 8. Approved equal
- B. Paper Towel Dispenser : Provided by Owner, installed by Contractor.
- C. Toilet Tissue Dispenser : Moem, Delta or approved equal surface mount, provided and installed by Contractor.
- D. Liquid-Soap Dispenser : Provided by Owner, installed by Contractor.

- E. ADA Grab Bars (pull down, swing or static); verify with Owner type required for specific location:
 - 1. Manufacturers: Bradley, Parker or equal
 - 2. Material: Stainless steel, 0.05 inch thick.
 - 3. Mounting: Exposed.
 - 4. Gripping Surfaces: Slip-resistant texture.
 - 5. Outside Diameter: 1-1/4 inches for medium-duty applications.

- F. ADA Mirror Unit:
 - 1. Glazing: Tempered glass.
 - 2. Frame: Stainless-steel angle, 0.05 inch thick, stainless-steel channel or stainless steel, fixed tilt based on installation requirements.

- G. Medicine Cabinet (or as noted on the scope document):
 - 1. Cabinets shall meet or exceed NuTone Surface Mount Steel Cabinets Model M18249301 or Recessed Steel Cabinet Model 468BC.
 - 2. Coordinate size and style with Owner for specific installation.
 - 3. Mounting: Surface, recessed or semi-recessed based on location. Height to be determined in the field.
 - 4. Size: Minimum size 16" x 26" or as required based on field conditions (Verify in field).
 - 5. Glass: Premium float glass.
 - 6. Door: Framed mirror door concealing storage cabinet equipped with continuous hinge- reversible for left-hand or right-hand door opening, and spring-buffered, rod-type stop and magnetic door catch.
 - 7. Shelves: 3 minimum, adjustable glass shelves.

- H. Robe/Towel Hook:
 - 1. Description: Double-prong unit, 2 per bathroom.
 - 2. Material and Finish: Polished chrome-plated zinc alloy (zamac).
 - 3. Mounting Height: To be determined in the field.

- I. Towel Bar:
 - 1. Décor Bathware, Moen, Pegasus or approved equal.
 - a. Reference noted Manufacturers and submit based on the requirements noted below (New towel bars shall be installed unless otherwise noted).
 - 2. Description: 3/4-inch square tube with rectangular end brackets
 - 3. Mounting: Flanges with concealed fasteners. Height to be determined in the field.

4. Length: 18 inches , 24 inches and/or 30 inches. Coordinate size in the field with Owner prior to installation.
5. Material and Finish: Polished chrome.

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 lb (1112 N), when tested according to method in ASTM F 446.
- B. Provide blocking (concealed or surface) as required to meet load requirements. Patch wall. Paint surface applied blocking to match wall color.
- C. 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 10801

SECTION 11451 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data.
- C. Regulatory Requirements: Comply with provisions of the following product certifications:
 - 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 2. UL and NEMA: Provide electrical components required as part of residential appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
- D. Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)." ANSI A117.1.
- E. Energy Ratings: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

PART 2 - PRODUCTS

2.1 RESIDENTIAL APPLIANCES

- A. Electric range and refrigerator, and hood fans specified may be purchased and delivered by Portland Electric, 275 Main St., Portland CT (860) 342-3993 Contact Person: Mike Botti.
- B. Alternate location for the purchase and delivery of appliances is from Gene's TV & Appliances
 - 1. 15 Rome Avenue
Middletown, CT 06457-2236
(860) 347-1134
 - 2. genestvandappliance.com
- C. Alternate location for the purchase and delivery of appliances is from Contractors Home Appliances, Inc.
 - 1. 9 So. Main St. (corner of rte 20 and 187)
 - 2. East Granby, CT 06026
 - 3. (860) 653-8266 – voice
 - 4. (860) 653-3155 – fax
 - 5. sales@contractorshomeappliances.com
- D. Electric Range: **30-inch** wide freestanding range with 4 burners (2) 6" & (2) 8" coils and standard cleaning oven with broiler unit. **24-inch** freestanding range with 4 burners (3) 6" & (1) 8" coil and standard cleaning oven with broiler unit.
 - 1. Products:
 - a. Magic Chef
 - b. General Electric

- c. Approved equal
 - 2. Color: White
- E. Refrigerator/Freezer: Freestanding, frost-free, two-door refrigerator with top-mounted freezer. Must be Energy Star certified.
 - 1. Products:
 - a. Frigidaire
 - 1) 12 cubic foot: FFPT12F0KW
 - 2) 15 cubic foot: FRT15HB3JW
 - 3) 17 cubic foot: FRT17HB3JW
 - 4) 18 cubic foot: FRT18HS6JW
 - 5) 21 cubic foot: FRT21HS6JW
 - b. Danby
 - 1) 11.4 cubic foot: DFF1144W
 - c. Approved equal. Requires approval of Owner prior to purchase.
 - 2. Capacity:
 - a. Woodframe Residences: 18 Cubic Feet
 - b. High Rise: 11.4 or 12 cubic feet
 - c. As identified for each individual project.
 - d. Coordinate final size requirements with Owner.
 - 3. Color: White
- F. Exhaust Hood
 - 1. Exterior Wall Locations: 30-inch under-cabinet exterior venting exhaust hood with fan and 75-watt light. Include all required ductwork, filter, and accessories for a complete installation. Provide as identified for each individual project based on site location and as identified in scope. Coordinate final size requirements with Owner.
 - 2. Interior Wall Locations: 24- inch or 30-inch under-cabinet non-ducted exhaust hood with fan and 75-watt light. Include filter and accessories for a complete installation. Provide as identified for each individual project based on site location and as identified in scope. Coordinate final size requirements with Owner.
 - 3. Products:
 - a. Woodframe Projects (Ducted Models):
 - 1) Broan 43000 Series 4-way convertible range hood; model numbers 433001 (30" white) or 433601 (36" white).
 - 2) Enclosed light and fan/filter assembly.
 - 3) Two speed, rocker-type fan control
 - 4) Includes 3-1/4" x 10" damper/adaptor and built-in 7" round adapter, vertical or horizontal installation.
 - 5) Sides shall be mitered and bottom edge hemmed, with no sharp edges.
 - 6) Air delivery shall be no less than 160 CFM and sound levels no greater than 7.0 sones (3-1/4" x 10" horizontal discharge), 190 CFM, 7.0 Sone (3-1/4" x 10" vertical discharge) or 220 CFM, 8.0 Sone (7" round discharge) performance.
 - 7) All air and sound ratings shall be HVI Certified.
 - 8) Provide all related filters, ductwork, duct tape, wall cap, damper, adapters, etc. for a full and complete installation based on field conditions.
 - 9) Provide owner with wall cap options.
 - 10) Range hood shall be UL listed.
 - b. Woodframe Projects (Non-Ducted Models):

- 1) Broan Series 41000 range hood two-speed non-ducted; model numbers 413001 (30" white) or 413601 (36" white) or 412401 (24" white).
 - 2) Enclosed light and fan/filter assembly.
 - 3) Two speed, rocker-type fan control
 - 4) Sides shall be mitered and bottom edge hemmed, with no sharp edges.
 - 5) All air and sound ratings shall be HVI Certified.
 - 6) Provide all related filters, damper, adapters, etc. for a full and complete installation based on field conditions.
 - 7) Range hood shall be UL listed.
- c. Approved Equal
4. Color: White on White.
 5. Fan Control: Hood-mounted switch, with separate light switch.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Freestanding Appliances: Place in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.
- B. *Coordinate refrigerator door swings requirements with specific project layout requirements. Change swing as required.***
- C. Exhaust fans shall be installed by the Contractor. Securely anchor to supporting cabinetry with concealed fasteners. Provide all required blocking as required for a complete and proper installation.
- D. Verify that clearances are adequate for proper functioning and rough openings are completely concealed.
- E. Exterior vented exhaust fans:
 1. Through wall ducting shall be insulated and fire caulked.
 2. Duct directly through the wall for range hoods mounted on an exterior wall.
 3. If a wall cap is used directly off the back of the hood, special care must be taken to make sure that the damper in the damper/duct connector on the hood and damper in the wall cap do not interfere with each other when the hood is operating. This could result in either inadequate air delivery or back drafts.
- F. Hood fans shall not be installed more than 30" or less than 24" from range top.**
- G. Test each item of residential appliances to verify proper operation. Make necessary adjustments.
- H. Verify that accessories required have been furnished and installed.

END OF SECTION 11451

SECTION 12356 - RESIDENTIAL CASEWORK

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Division 6 – Woods and Plastics.
- C. Submittals: Product Data and dimensioned layout Shop Drawings.
- D. Verify dimensions by field measurements prior to ordering cabinets. Measure for countertops after base cabinet has been installed. Field measurements shall be made immediately upon award of contract to eliminate lead time issues.

PART 2 - PRODUCTS

2.1 CASEWORK

- A. Kitchen Cabinets (upper/lower):
 - 1. Products:
 - a. Kraftmaid Cabinetry
 - 1) Woodframe Houses (**unless otherwise noted in the scope document**):
Cabinet Style / Species / Finish: Square Recessed Panel – Solid (DRHM) / Maple / Honey Spice
- B. Drawers: ¾” thick, solid hardwood drawer cores with dovetail joinery and 3/16” plywood bottom. Full extension Whisper touch drawer runners – No substitutions allowed.
- C. Cabinet boxes shall have plywood end construction.
- D. Shelving: ¾” full depth with natural birch wood grain laminate.
- E. Hinges: Concealed whisper touch.
- F. Plastic-Laminate Countertops and Full Height Back and Side Splashes (Kitchen Only):
 - 1. Substrate: Exterior plywood, PS 1, Grade C-C Plugged, touch sanded.
 - 2. Manufacturer / Color #: Wilsonart Laminate / 4166-60 Pampas or as specified by Owner. Provide standard laminate color selection.
- G. Countertop Configuration:
 - 1. Front Style: Square
 - 2. Backsplash / Endsplash: Square with Full-height laminate on wall to underside of upper cabinet.
- H. Bathroom Vanity
 - 1. Products:

WESLEYAN UNIVERSITY

- a. St. Paul Chelsea 26 1/2 inch vanity in nutmeg with porcelain vanity top in white with white basin. Model No: CH24EUP2COM-N.
- b. Kraftmaid Cabinetry
 - 1) Cabinet Style / Species / Finish: Square Recessed Panel – Solid (DRHM) / Maple / Honey Spice
 - 2) Size: As noted. Construction to match kitchen cabinets.
- I. Drawer / Door Pulls: Knob style. Provide manufacturers standard finish palate for Owner selection.
- J. Vanity Top: Integral lavatory and countertop with backsplash. Size shall be coordinated with vanity base.
 - 1. Products:
 - a. Cultured marble or solid surface material by Corian, Transolid, Nevamar, Vermax or approved equal.
 - b. Color: To be selected by the Owner from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cabinets with no variations in flushness of adjoining surfaces by using concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match casework face.
- B. Install cabinets without distortion so doors and drawers fit openings properly and are aligned.
- C. Install level and plumb to a tolerance of 1/8 inch in 8 feet.
- D. Fasten each cabinet to adjacent unit and to structural members of wall construction. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches on center.
- E. Fasten plastic-laminate countertops by screwing through corner blocks in base units into underside of countertop. Align adjacent surfaces. Spline and glue joints in countertops and use concealed mechanical clamps. Form seams 1/8 inch wide and adhere with manufacturer's recommended joint adhesive in color to match countertop. Dress joints smooth, remove surface scratches, and clean entire surface.
- F. Furnish and install full height laminate onto the wall, from the top of the kitchen countertop to the underside of the upper cabinets – typical for all kitchens. When range is installed in line with base cabinets, extend full height laminate onto the wall and provide finished edge – typical for all kitchens.
- G. Plastic Laminate Islands: Fasten plastic-laminate islands to wall with steel L-bracket width of island. Provide round steel support leg with rubber foot to protect floor and provide a non-slip installation.

END OF SECTION 12356

SECTION 12500 - WINDOW TREATMENT

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1: General Requirements are made apart of this section.
- B. Submittals: Product Data, Samples, Shop Drawings.

1.2 QUALITY ASSURANCE

- 1. Flame Resistance: Provide shades identical to those tested and passed for flame resistance per applicable test of NFPA 701 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.3 PROJECT CONDITIONS

- 1. Field Measurements: Verify openings by field measurements before fabrication

PART 2 - PRODUCTS

2.1 Window Shades: (Locations as identified by the Owner)

A. Products:

- 1. Draper SunBloc Series SB9000/9100 - Manual Flex Shade, Bead Chain Clutch Operator.
 - a. Color: White (Submit manufacturer's standard colors to Owner for final approval)
- 2. Mecho blackout shade cloth, Thermoveil Series 0700
 - a. Color: White (Submit manufacturer's standard colors to Owner for final approval)
- 3. Approved Equal

B. Light Filtering Shade cloth: Draper Style 4400 / Mecho Thermoveil Series 1300, Color: To be selected by the owner

C. Black-out Shade cloth: Draper SunBloc Series SB9000-9100 / Mecho Thermoveil Series 0700. Color: To be selected by the owner

D. Accessories: Brackets, head boxes, chain pulls, end caps where needed.

E. Fascia shall be provided in academic and administrative facilities unless otherwise directed. Fascia shall not be provided in woodframe, program or apartment houses. Coordinate fascia requirements with Owner.

F. Provide shade units with Lift Assistance at all locations.

2.2 Roller Shades: (Woodframes and other locations as identified by the Owner).

- A. White, 12 mill, room darkening vinyl roller shades

2.3 Horizontal Window Blinds: (Woodframes and other locations as identified by the Owner)

A. Products:

1. 1” mini blinds by Levelor, Bali or approved equal
 - a. Material: Vinyl
 - b. Color: White (Submit manufacturer’s standard colors to Owner for final approval)

2.3 Vertical Window Blinds:

A. Products:

1. 2” slats blinds by Levelor, Bali or approved equal
 - a. Material: Vinyl
 - b. Color: White (Submit manufacturer’s standard colors to Owner for final approval)
 - c. Coordinate mounting location with Owner.

2.4 Window Film:

A. Products:

1. Gila
2. 3-M
3. Approved equal
 - a. Privacy Adhesive Window Tint
 - 1) Material: Vinyl, plastic
 - 2) Color: Frosted/Opaque White (Submit manufacturer’s standard colors/films to Owner for final approval)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Isolate metal parts of window treatment hardware from concrete or mortar to prevent galvanic action. Use tape or another method recommended by manufacturer.

END OF SECTION 12500

SECTION 13080: SOUND CONTROL ACCESS SYSTEMS NOISE-LOCK DOORS

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide sound control door and frame assemblies where shown on the Drawings, as specified herein, and listed on the Door Schedule. The work includes door and frame assemblies complete with acoustical seals, cam-lift hinges, vision lites, and all finish hardware factory supplied and installed. Door leaf and frame factory assembled and shipped complete as one unit.

- B. Related Sections:
 - 1. Section 04200: Concrete Unit Masonry.
 - 2. Section 08710: Finish Hardware.
 - 3. Section 08810: Glazing
 - 4. Section 09110: Metal Stud System.
 - 5. Section 09260: Gypsum Wallboard System.
 - 6. Section 09900: Painting.

1.02 SYSTEM PERFORMANCE REQUIREMENTS

- A. Sound Rating: Provide door and frame assemblies that have been fabricated as sound-retardant units, tested according to ASTM E 90 and have the following certified Sound Transmission Class (STC) rating as determined according to ASTM E 413.

STC Rating 51

1.03 SUBMITTALS

- A. Comply with pertinent provisions of the Contract and Division 1.

- B. Product Data: Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Material lists of items provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation and anchorage.

4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
5. Test Reports from a qualified independent testing agency indicating and interpreting test results from Part 3 of this Section relative to compliance of sound ratings with the indicated requirements.

1.04 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Acoustical Performance
 1. The acoustical door manufacturer will be required to submit acoustical performance data in the form of up-to-date test reports from an independent testing laboratory indicating the doors to be provided will have the required Sound Transmission Class Rating (ASTM E-90-90).
 2. Door and Frame Assembly be rated STC 51.
 3. Owner may at his option order performance tests of installed door assemblies by an independent consultant to verify compliance with the specifications. Any discrepancies shall be repaired or replaced without cost to the Owner.
- C. Single-Source Responsibility: Provide sound control doors and frames, including gaskets, hinges and other hardware items essential for sound control as an assembly and by a single firm specializing in producing this type of work for a minimum of ten (10) years.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades.

1.06 WARRANTY

- A. Acoustic door materials and hardware shall be guaranteed against defective workmanship for one (1) year from date of shipment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide “Noise Lock” acoustic door(s) and frame(s) with cam lift hinges and split frames as manufactured by Industrial Acoustics Co, Inc (IAC), c/o QuietStar Industries, 7216 Bergenline Ave North Bergen, NJ 07047 Attn: Steve Dutton or Craig D’Anna, Tel: 201-868-5600. Equivalent products will be considered, when submitted for approval prior to the bid opening, and meet or exceed the requirements of this specification.

2.02 MANUFACTURED ASSEMBLIES (NOISE LOCK DOORS)

- A. Door leaf(s) minimum thickness:

STC 51 Rating, 2 ½” (64 mm) with a guaranteed NIC 45

Door leaf(s) and door stiffeners are to be fabricated from 14 gauge (2 mm) cold rolled, galvanized steel with an A60 coating weight, and filled with 6 lb density, sound absorbing, and damping elements.

- B. Frame(s) shall be fabricated from 14 gauge cold rolled, galvanized steel with an A60 coating weight and furnished “split” in two (2) pieces, inside and outside, that are mitered and welded together allowing for easy installation into either existing or new construction openings.

- C. Acoustic seals: Doorjamb, meeting stiles of double doors and at the head of the door and frame shall receive self-aligning magnetic seals. Door(s) to be held in closed position by magnetic force of perimeter seals.

Acoustic labyrinth shall be created when door is in closed position. Bottom of door leaf shall contain continuous, adjustable, gravity-activated seal that shall compress against the floor as the door is closed. Raised sills and threshold drop seals will not be acceptable.

Acoustic Seal assemblies as follows:

STC 51 Rating, Double magnetic type

- D. Jamb anchors: Provide jamb anchors as determined by wall construction. Anchors are to be spaced at 12” (305 mm) on center (max) and are to be of a corrosion resistant material.

- E. Hardware

Hinges: 1 pair IAC, cam-lift, butt-type, hinges, US26D finish (Hinge manufacturer to furnish laboratory test data certifying that hinges of identical design have been cycled a minimum of 125,000 times while supporting a door leaf weighing a minimum of 350 lbs.)

Mortise Lock Set:

1. Corbin Russwin to match existing hardware. Bright chrome lever handle. Mortise cylinder with removable construction core. Coordinate ordering of proprietary core with Owner.

2. Best 45HQ Prox Reader mortise lockset and deadbolt & LCN 4040 door closer.
3. Von Duprin exit devices on each side door leaf and Dorma closer / coordinator assembly – no mullion. Dog down feature required.

Threshold: ¼” Aluminum threshold, 4” wide – Length proper to support door frame.

Latchsets/Locksets: Provided and installed by door supplier. Refer to finish hardware section for manufacturer, type and details.

F. Hardware Reinforcement

1. Hinges: Minimum of ¼” (6 mm) thick x 2” (51 mm) wide x 7 ½” (191 mm) lg.
2. Frames: Minimum of 3/16” (5 mm) thick for strikes and #11 (3 mm) gauge for closers.
3. Doors: Minimum of #11 (3 mm) gauge for lock boxes and closers.

G. Glazing

Provide factory-installed, aluminum extruded stops and moldings with true mitered corners for double, glazed assemblies. Size of vision lite is to be 22” x 66. Manufacturer to supply and factory install (2) lites of laminated safety glass as required to maintain the specified sound transmission class rating.

2.03 PRE-HUNG

- A. Assembly and adjustment of door leaf, frame, acoustic seals, hinges and associated finish hardware shall take place at the factory to insure ease of installation, reliable operation and acoustic performance. The entire manufactured assembly shall be shipped to the job site ready to install and operate.

2.04 FABRICATION

- A. General: Fabricate units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Wherever practical, fit and assemble units in the manufacturer’s plant. Identify work that is not permanently factory-assembled before shipment to ensure proper assembly at the Project site. Weld exposed joints continuously: grind, fill dress and make smooth flush and invisible.

2.05 FINISHES (FACTORY)

- A. Doors and frames shall receive a shop coat of a powder coat primer. The primer shall be applied over properly prepared metal, in accordance with the manufacturer’s standard shop prime coat procedure.

- B. Others, as required, will perform finish painting, staining and/or varnish, under the painting section 09910 of this Specification.

3.01 MANUFACTURER'S INSTRUCTIONS

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

3.02 PREPARATION

Owner to be responsible for removing existing doors and preparing walls properly for installation by door manufacturer.

- A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
- B. Adjacent Construction: Coordinate door assembly details with details of adjacent work to ensure proper attachments and clean junctions.

3.03 INSTALLATION

- A. Install work coordinated and supplied by the manufacturer in accordance with reviewed shop drawings and these specifications using only factory-trained personnel as required by the Manufacturer and approved by the Architect.
 - 1. Hang doors and adjust for free swinging operation without binding, sticking, sagging or excessive clearances.
 - 2. During installation, solidly pack acoustic insulation around frames that are installed in stud and gypsum-wallboard partitions.
 - 3. Caulk exterior joint prior to painting.
 - 4. Install sound control door assemblies during finish phase of construction to protect units from damage.
 - 5. When installation is otherwise complete, adjust operating hardware for proper operation and function.

3.04 FIELD QUALITY CONTROL

- A. Upon completion of this portion of work, and prior to its acceptance by the Owner, secure a visit to the job site by a qualified representative of the manufacturer of the acoustical door system(s) to confirm that installation is in conformance with the manufacturer's recommendations.

3.06 DEMONSTRATION

- A. Instruct the Owner's maintenance personnel regarding operation and maintenance of all acoustic doors.

WESLEYAN UNIVERSITY

END OF SECTION

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Summary: General requirements for motors, hangers and supports, vibration isolation and seismic restraints, valves, and meters and gages.
- B. Submittals: Product data for materials and equipment specified in this section.

PART 2 - PRODUCTS

2.1 MOTORS

A. Motor Characteristics:

1. Motors 1/2 HP and Larger: Three phase unless otherwise noted.
2. Motors Smaller Than 1/2 HP: Single phase unless otherwise noted.
3. Frequency Rating: 60 Hz unless otherwise noted.
4. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.
5. Service Factor: 1.15 for open drip proof motors; 1.0 for totally enclosed motors.
6. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
7. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
8. Enclosure: Unless otherwise indicated, open drip proof.
9. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

2.2 HANGERS AND SUPPORTS

- A. Hanger and Pipe Attachments: Factory fabricated with galvanized coatings; nonmetallic coated for hangers in direct contact with copper tubing.
- B. Building Attachments: Powder-actuated-type, drive-pin attachments with pullout and shear capacities appropriate for supported loads and building materials.
- C. Mechanical-Expansion Anchors: Insert wedge-type attachments with pullout and shear capacities appropriate for supported loads and building materials.

2.3 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICES

A. Vibration Supports:

1. Restrained or Elastomeric Mounts: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and baseplate for bolting to structure. Provide isolator with minimum 0.5-inch static deflection.
2. Spring Isolators: Freestanding, laterally stable, restrained or open-spring isolators. Provide isolator with minimum 1-inch static deflection.

B. Vibration Hangers:

1. Elastomeric Hangers: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements bonded to steel housings with threaded connections for hanger rods. Provide isolator with minimum 0.5 inch static deflection.
2. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression. Provide isolator with minimum 1 inch static deflection.

C. Seismic Restraints:

1. Resilient Isolation Washers and Bushings: 1-piece, molded, bridge-bearing neoprene complying with AASHTO M 251 and having a durometer hardness of 50 unless otherwise noted, plus or minus 5, with a flat washer face.
2. Restraining Cables: Galvanized steel cables with end connections made of steel assemblies that swivel to final installation angle and utilize two clamping bolts for cable engagement.
3. Anchor Bolts: Seismic-rated, drill-in, and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488/E 488M.

2.4 PRESSURE GAGES AND TEST PLUGS

- A. Pressure Gages: Direct-Mounting, indicating-dial type complying with ASME B40.100. Dry metal case, minimum 2-1/2 inch diameter with red pointer on white face, and plastic window. Minimum accuracy 3 percent of middle half of range. Range two times operating pressure.
- B. Test Plug: Corrosion-resistant brass or stainless-steel body with two self-sealing rubber core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping. Minimum pressure and temperature rating 500 psig at 200 deg F.

PART 3 - EXECUTION

3.1 MOTOR INSTALLATION

- A. Anchor motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions.

3.2 GENERAL PIPING INSTALLATIONS

- A. Install piping free of sags and bends.
- B. Install fittings for changes in direction and branch connections.
- C. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- D. Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast-iron pipes for wall sleeves.
- E. Fire-Barrier Penetrations: Seal pipe penetrations with through-penetration firestop systems specified in Division 7.
- F. Install unions at final connection to each piece of equipment.
- G. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.
- H. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping.

3.3 GENERAL EQUIPMENT INSTALLATIONS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.4 CONCRETE BASES

- A. Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
- B. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
- C. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base to connect concrete base to concrete floor.
- D. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.

- E. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
- F. Install anchor bolts to elevations required for proper attachment to supported equipment.
- G. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 3 Section "Cast-in-Place Concrete."

3.5 HANGERS AND SUPPORTS

- A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.
- B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.
- C. Install powder-actuated drive-pin fasteners in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.
- D. Install mechanical-expansion anchors in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.
- E. See Division 13 Section "Fire Suppression Piping" for support of fire-protection system piping.
- F. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- G. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
 - 1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 - 2. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 - 3. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 - 4. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 - 5. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
- H. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

3.6 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICE INSTALLATION

- A. Adjust vibration isolators to allow free movement of equipment limited by restraints.
- B. Install resilient bolt isolation washers on equipment anchor bolts.
- C. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.

3.7 PRESSURE GAGES AND TEST PLUGS

- A. Install pressure gages at suction and discharge of each pump.
- B. Install test plugs at supply and return for hydronic terminals, and boilers.

END OF SECTION 15050

SECTION 15325 – FIRE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 General Requirements

- A. The Fire Sprinkler Contractor (hereinafter referred to as “The Contractor”) shall furnish all labor, equipment and materials and perform all operations required to install complete fire protection sprinkler systems for Wesleyan University at locations as identified. Each location shall be priced separately and the cost for each shall be identified in the appropriate space on the bid proposal form.
- B. At the time of bid, all exceptions taken to, all variances from, and all substitutions of operating capabilities or equipment called for in these specifications shall be listed in writing and forwarded to the Project Manager. Any such exceptions, variances, or substitutions which were not listed at the time of bid and are identified in the submittal shall be grounds for disapproval without comment.

1.2 Quality Assurance

- A. This specification identifies the essential performance requirements of the automatic fire sprinkler systems designed to protect the selected buildings at Wesleyan University. All equipment furnished and system configurations as installed shall meet or exceed the functional intent of this specification.
- B. Sprinklers, valves, water flow alarms, and supervisory devices shall be Underwriters' Laboratories, Inc. (UL) listed or Factory Mutual Research Corporation (FM) approved.
- C. All materials and equipment furnished and installed shall be new, unused and first class without defects; in continuous production and providing satisfactory service in commercial applications for at least one year; and designed to function properly in that portion of the work for which they are intended. Obsolete equipment shall not be used.

1.3 Scope of Work

- A. The work covered by this specification includes the installation of a complete fire sprinkler system in various buildings on the Wesleyan University campus.
- B. The Contractor shall provide all labor, materials, tools, equipment, supervision, services and testing required to provide complete, code compliant operating systems which interface properly with the fire alarm system (by others) and are acceptable in all respects to the authorities having jurisdiction.
- C. It is the responsibility of the Contractor to visit the site, evaluate the existing conditions, perform calculations, create shop drawings, and determine both the quantities of materials required and suitable locations for sprinklers, piping, hangers, and seismic bracing supports in accordance with applicable codes and standards.

1.4 Qualifications of Bidders

- A. The Contractor shall provide a statement of qualifications for both the company and the individual foreman assigned to this project in terms of installing fire sprinkler systems.
- B. All Contractors shall document their record of complete, satisfactory installation of fire sprinkler systems.

1.5 Codes and Standards

- A. The systems installed, without exception, shall comply with all applicable state and local codes, variances and regulations and shall be approved by the authorities having jurisdiction.
- B. All equipment furnished shall be listed by Underwriters Laboratories, Inc., under the following applicable standards:

UL 193	Alarm valves for fire protection service
UL 260	Dry pipe and deluge valves for fire protection service
UL 312	Check valves for fire protection service
UL 753	Alarm accessories for automatic water supply control valves for fire protection service
UL 393	Indicating pressure gauges for fire protection service
UL 213	Rubber gasketed fittings for fire protection service
UL 1486	Quick opening devices for dry pipe valves for fire protection service
UL 199	Automatic sprinklers for fire protection service
UL 1091	Butterfly valves for fire protection service
UL 262	Gate valves for fire protection service
UL 203	Pipe hanger equipment for fire protection service
UL 203A	Seismic bracing for fire protection service
UL 405	Fire department connections
UL 508	Industrial control equipment
UL 1479	Fire tests of through-penetration firestops

- C. The following manufacturing standards and specification are applicable to fire sprinkler systems and are referenced within this specification.

ANSI/ASME	B36.10M	Welded and seamless wrought steel pipe
ANSI/ASME	B1.20.1	Pipe threads, general purpose
ANSI/ASME	B16.4	Cast iron threaded fittings
ANSI/ASME	B16.3	Malleable iron threaded fittings
ASTM	A53	Standard specification for pipe, steel, black and hot-dipped, zinc-coated, welded, and seamless
ASTM	A47	Specification for malleable iron castings
ASTM	A135	Standard specification for electric-resistance welded steel pipe
ASTM	A148	Specification for steel castings for high-strength, structural purposes
ASTM	B633	Specification for electrodeposited coatings of zinc on iron and steel
ASTM	A165	Specification for electrodeposited coatings of cadmium on steel
ASTM	A536	Specification for ductile iron castings

ASTM	A582	Specification for free-machining stainless and heat-resisting steel bars, hot-rolled or cold-finished
ASTM	A584	Specification for aluminum-coated steel-woven wire fence fabric
ASTM	A795	Standard specification for black and hot-dipped zinc-coated (galvanized) welded and seamless steel pipe for fire protection use

- D. If a UL Listing is unavailable, approval by Factory Mutual is acceptable.
- E. Installation shall be made in accordance with the applicable provisions of the edition of the code or standard accepted by the local authority having jurisdiction. Applicable reference standards include:

NFPA 13 Installation of Sprinkler Systems
NFPA 13R Installation of Sprinkler Systems in Residential Occupancies
NFPA 13D Installation of Sprinkler Systems in One and Two Family Dwellings
NFPA 24 Installation of Private Fire Service Mains
NFPA 70 National Electric Code (as amended by Connecticut codes)
NFPA 72 National Fire Alarm Code

- E. Equipment installation and acceptance testing shall be in accordance with the manufacturer's guidelines.
- G. Systems shall be acceptance tested in accordance with the applicable provisions of the edition of the standards listed below which are accepted by the authority having jurisdiction:

NFPA 13 Installation of Sprinkler Systems
NFPA 13R Installation of Sprinkler Systems in Residential Occupancies
NFPA 13D Installation of Sprinkler Systems in One and Two Family Dwellings
NFPA 25 Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
NFPA 72 National Fire Alarm Code

1.6 Order of Precedence

- A. Where conflicts arise from discrepancies between referenced documents, the more stringent requirement shall apply. Where the degree of stringency cannot be determined, discrepancies shall be resolved as follows:
1. State and local codes, variances and regulations shall take precedence over this specification.
 2. The National Fire Protection Association standards shall take precedence over this specification.
 3. This specification shall take precedence over any drawings.

1.7 Related Work

- A. The Contractor shall coordinate work in this specification with all related trades.

- B. The Contractor shall verify and coordinate the location of the water service with the site contractor. The water service supply line shall be 2". If a larger water service supply is required based on sprinkler calculations and pressure in the street, Sprinkler Contractor shall notify Owner promptly. Site Contractor shall provide and add/alternate cost for a 3" water service supply line.
- C. The Contractor's foreman shall participate in weekly project meetings with the Project Manager.
- D. The Contractor shall seal all penetrations with a listed through-penetration seal system tested by a nationally recognized testing laboratory.
- E. The Contractor shall be responsible for priming and painting all exposed sprinkler pipe and fittings upon completion of the installation.
- F. The Contractor shall be responsible for patching, priming and painting all wall and ceiling areas that have been penetrated or disturbed due to the sprinkler piping installation.

1.8 Submittals

- A. The Contractor shall submit to the Project Manager sufficient information to describe his/her qualifications, the work efforts to be performed, and the materials to be provided. The Contractor shall certify that he/she has reviewed the documentation to verify: dimensions; quantities; installation and fabrication techniques, procedures, and sequences; good workmanship and safety precautions; and that they are in conformance with this specification.
 - 1. These reviews are not the responsibility of the Project Manager. The Project Manager will only review these documents for the limited purposes of checking for general compliance with the information provided in the contract documents and general conformance with the design concept of this part of the project, and not to determine accuracy or completeness of other details such as dimensions and quantities. The Project Manager will not approve means, methods or procedures of construction or installation nor will they review for safety precautions. Accuracy and process are the responsibility of the Contractor.
- C. The Contractor shall submit to the Project Manager the names of all subcontractors and their qualifications, indicating years in business and prior experience with installations of this type, and includes the type of equipment and service that will be supplied.
- D. The awarded Contractor shall submit three (3) copies of the following documents prior to performing any work:
 - 1. A schedule indicating the installation sequence for all systems and equipment and the time frame required to complete each phase of the work. Projected dates of delivery of the equipment to be supplied, installation completion, demonstration test, and final test/acceptance dates shall be included.
 - 2. Submittals shall include original manufacturer's specification and installation instruction sheets; sprinkler fabrication drawings and hydraulic calculations; piping, hangers and appurtenances; sprinkler heads and cabinets; backflow preventer; valves; seismic bracing.

bracing. All equipment and devices on the shop drawings to be furnished under this contract shall be clearly marked in the specification sheets. If any equipment and/or devices required in the system are not so marked, the Project Manager will return the submittal for correction and clarification.

3. Shop drawings shall be prepared using AutoCAD or a compatible program that will open with AutoCAD version 2006. Contractor shall field measure all houses to create floor plans for each individual project location. Sprinkler layouts shall be designed based on existing field dimensions, layout conditions and identified Add-A-Bed locations.
 4. Sufficient information shall be submitted so that the exact function of each installed device is known.
 5. It is the responsibility of the contractor to determine how the pipe will be located and provide all required information for sizing the seismic braces in the shop drawing submittal. All seismic brace locations, based on actual field condition, shall be shown on the shop drawing.
- E. The Contractor shall not order any equipment nor perform any installations prior to completion of review of the submittals by the Project Manager and receipt of written authority to proceed to the next milestone from the Owner.

PART 2 PRODUCTS

2.1 General Systems Descriptions

- A. The new automatic fire sprinkler system shall be connected to the new water supply, starting at the flange connection inside the building. The system when completed shall include at least the following components:
1. A DEP approved and UL Listed double check valve backflow prevention device.
 2. Alarm check valves and trim, and inspectors' test stations.
 3. Sprinklers of the temperature ratings and orifice sizes as required.
 4. Sprinkler piping and fittings of the materials, schedules, types and configurations as specified herein and as required.
 5. All other required system components as specified herein and as required per code.
 6. All water flow alarms and supervisory switches and the electrical contacts required to connect them to the fire alarm control panel.
 7. All core drilling, cutting, patching, sealing and painting required to install the system and restore floor, wall and ceiling penetrations to a sound, tight condition and neat appearance.
 8. Fire department connection with fittings compatible with the equipment used by the local fire department.

2.2 Sprinkler Pipe, Fittings, Hangers, and Supports

A. General

1. All pipe, fittings, hangers, and supports shall be prepared and installed in accordance with all applicable requirements of NFPA 13, 13D and/or 13R, and the manufacturer's published installation instructions including: material, size, wall thickness, and joining methods.

NOTE: CPVC and PB Piping (plastic) materials shall not be used for any fire sprinkler projects on campus – no exceptions.

B. Steel Pipe

1. 2-1/2 inch nominal size and larger pipe shall be Schedule 10 steel pipe with roll grooved ends, UL Listed for use in fire protection systems and shall be 175 psi rated.
2. 2 inch nominal size and smaller piping shall be Schedule 40 pipe, UL Listed for use in fire protection systems and shall be 175 psi rated.

D. Fittings

1. Mechanical couplings for steel pipe: couplings shall consist of a one piece or multiple piece ductile iron (ASTM A536) or malleable iron (ASTM A47) cast housing, a synthetic rubber gasket or a central cavity pressure responsive design with the unit secured by nuts, bolts, locking toggle, or lugs.
2. Fittings for grooved steel sprinkler pipe: fittings shall be full flow designed to accept mechanical groove couplings. Fittings shall be cast iron (ASTM A536) alkyd enamel painted, zinc electroplated (ASTM B633) or cadmium plated (ASTM A165).
3. Fittings for threaded steel sprinkler pipe: cast iron threaded fittings (ANSI/ASME B16.4).

E. Hangers and Supports

1. General: The requirements of NFPA 13 and MSS-SP-69 "Pipe Hangers and Supports - Selection and Application" shall govern. Where discrepancies occur, follow the requirements of the latest edition of NFPA 13.
2. Threaded pipe and fittings: provide at least one hanger for each pipe length greater than 5 feet. Maximum hanger spacing shall not exceed 10 feet for nominal pipe sizes 1-1/4 inches and smaller or 10 feet for nominal pipe sizes 1-1/2 through 6 inches.
3. Grooved pipe and fittings: where full linear movement is required for nominal pipe sizes from 2-1/2 through 4 inches provide one hanger for each 5 feet of pipe supported. For nominal pipe sizes of 6 and 8 inches, provide one hanger for each 10 feet of pipe supported.

F. Seismic Bracing

1. General: The requirements of NFPA 13, Section 4-14.4.3, *Protection of Piping Against Damage Where Subject to Earthquakes* shall govern.
2. Seismic bracing shall be provided for all sprinkler piping in the buildings for pipe greater

greater than or equal to 2-1/2 inches in diameter. All feeder mains, regardless of size, shall be braced.

3. All seismic braces shall be listed for tension and compression service.
4. All braces shall utilize ordinary black steel piping as the prime support member.
5. Structural connection: All bracing shall be connected to the building's structural members and all means of connection to the building's structure and sprinkler pipe shall be listed for the intended use.
6. At a minimum, the bracing shall be provided per NFPA 13 requirements or per manufacturer's recommendations.

G. Pipe Sleeves and Clearances

1. Proper clearances between penetrating sprinkler system piping, including drains and fire department connections, and any barrier shall be provided.
2. Piping passing through floors, walls, and ceilings shall be provided with steel pipe sleeves.
3. Fill the space between the pipe and the sleeve with a listed flexible 2 hour-rated fire stop system. See SECTION 07841 - THROUGH-PENETRATION FIRESTOP SYSTEMS.

2.3 Valves

- A. General: Indicating type valves shall be OS&Y, UL Listed or FM Approved for fire protection systems.
 1. Sizes 2-1/2 inches and larger: 175 psi rated, flanged ends.
 2. 2 inches and smaller: 175 psi rated, screwed ends.
- B. In lieu of 2 inches and smaller OS&Y gate valves at flow control stations, the Contractor may install Milwaukee Valve Co.'s grooved-end butterfly valve with factory installed internal tamper switch, UL Listed and FM approved.
- C. Automatic Drain (Ball Drip) Valves: Bronze body (ASTM B584), steel inlet spring loaded ball mechanism with stainless steel or brass ball and beryllium copper spring.
- D. Alarm Check Valves: UL listed and/or FM approved valves, with appropriate trim, 175 psi rated.
- E. Check Valves: Butterfly type, wafer check valves; O-ring sealed clapper, torsion spring loaded, suitable for vertical or horizontal installation. Bronze seat rings (ASTM B584), aluminum bronze clappers (ASTM B148), EPDM O-ring seals, stainless steel hinge pins (ASTM A582), rated at 175 psi. Provide accessory kits for flange fittings as required; stud bolts and heavy hex nuts of carbon steel zinc, or cadmium plated.
- F. Ball Valves: Standard port, end entry, 175 psi rated; bronze body, adjustable packing gland, reinforced Teflon seats, non-blowout stem design, chrome plated brass ball, cadmium plated vinyl insulated handle. When used for manual drains provide pressure gauge and inspector's test plug at drains per NFPA 13R.

- G. Air Vent and Release Valves: Cast iron body and cover primed with red oxide exterior primer, brass internal parts, stainless steel float and needle, 175 psi rated.

2.4 Automatic Sprinklers

- A. Sprinklers of the temperature rating and orifice size as required by NFPA 13R shall be installed.
- B. Provide a reserve supply cabinet of spot welded low carbon steel construction at least 0.042 inch thick, bright red enamel painted inside and out. Provide spare sprinklers and suitable sprinkler wrenches for each sprinkler type and temperature rating installed in the systems.
- C. The Contractor shall coordinate and verify the cap color of all sprinklers specified as concealed sprinklers. Each area shall be coordinated with the Owner separately. The cap color shall be a factory-applied finish, meeting the requirements of the listing agency.
- D. The Response Time Index (RTI) shall be supplied by the manufacturer for each sprinkler supplied. The Contractor shall supply this information to the Project Manager in the equipment submittal package.

2.5 Alarms and Supervisory Devices

- A. General: Wherever monitor modules exist for the purpose of fire alarm supervision, the sprinkler Contractor shall connect the sprinkler system device to these modules.
- B. Waterflow Detectors: Vane-type waterflow detectors designed for vertical or horizontal mounting. NEMA Type 1 enclosure; UL Listed and FM Approved.
- C. Monitor switches for OS&Y Valves: Potter Electric model PCVS or approved equal with dual set of contacts; Plunger operated SPDT electrical switching device for supervision of the open position of OS&Y gate valves. UL and FM Approved; NEMA type 2 drip tight indoor rated housing.

PART 3 EXECUTION

3.1 Installation

- A. The Contractor shall provide and install all required equipment and accessories necessary for the proper operation of the system. The entire system shall be installed in a workman-like manner and all work shall be performed in accordance with the best and most modern practices of the trade. The final installation shall present a neat appearance.
- B. The Contractor shall coordinate the work of this specification with all related work of other trades.
- C. Piping Installation
 - 1. The Contractor shall place pipe runs to minimize obstruction to other work.
 - 2. The Contractor shall, where possible, center sprinklers in ceiling tiles or, at a minimum, align all sprinklers in each space or area.
 - 3. The Contractor shall install all piping in accordance with applicable provisions of NFPA 13, NFPA 13R or NFPA 13D.

4. The Contractor shall remove all burrs and ream all pipe and tube ends to full inside diameter.
5. The Contractor shall remove all scale and foreign matter from the inside and the outside of all pipe and apply joint compound or tape to all threaded pipe ends.
6. The Contractor shall install mechanical grooved systems in full accord with the manufacturer's instructions.
7. The Contractor shall not permit piping to penetrate building structural members.
8. All pipe shall be properly pitched in order to drain.

D. Valve Installation

1. The Contractor shall install all valves with stems upright or horizontal; not inverted.
2. The Contractor shall provide drain valves at main shut-off valves, at all piping low points and at all apparatus.

3.2 Scheduling

- A. The Contractor shall, each week, provide a revised schedule indicating the work remaining to be done and the estimated time required to complete the work.

3.3 Final Acceptance Tests

- A. At the time as-built drawings and manuals are submitted, the Contractor shall submit a test plan which shall describe how the system will be acceptance tested. This shall include a step-by-step description of all tests and shall indicate type and location of test apparatus to be employed. The tests shall demonstrate that the operating and installation requirements of this specification have been met.
- B. A pre-final test shall be conducted to verify proper system operation prior to final acceptance testing to be witnessed by the Fire Department. This pre-test shall include all of the same functions specified for the final acceptance test.
- C. Before the fire suppression systems installations are considered complete and acceptable to the Owner and the authority having jurisdiction, acceptance tests shall be conducted on the systems by the Contractor's job foreman in the presence of representatives of the Owner and the fire department. The fire department shall receive notification of the date and time of the tests at least one week prior to the test date.
- D. The Contractor shall provide all personnel and equipment required to conduct the tests.
- E. The Contractor shall perform the following tests:
 1. A two hour hydrostatic test at 200 psi, or as recommended by manufacturer, of all fire sprinkler and standpipe piping in accordance with NFPA 13, 13R or 13D.
 2. Main drain tests, inspectors tests (of the water flow alarms) and dry pipe valve trip tests.
- F. Upon completion of the tests, the Contractor shall leave the fire sprinkler systems in full working order and, without additional expense to the Owner, shall replace any defective materials, devices, or equipment provided by him under this contract within one (1) year from the date of final

final systems acceptance by the Owner.

3.4 As-Built Drawings

- A. The Contractor shall submit a complete set of as-built drawings to the Project Manager. The Project Manager will only review these drawings for the limited purpose of checking for general compliance with accepted drawing practices and conformance with the design concept and not to determine accuracy or completeness of the design. If for any reason at the discretion of Project Manager the drawings must be resubmitted, the Contractor will correct the drawings at no charge and retention will not be released until corrections are complete.
- B. Once the drawings are returned with “No Exceptions Taken” the Contractor shall deliver a complete set of reproducible as-built drawings, two (2) print copies and a AutoCAD disk of the as-built drawings to the Owner upon completion of the system. The AutoCAD drawings shall be compatible with AutoCAD version 2006.

3.5 Training Requirements

- A. Prior to final acceptance, the Contractor shall provide operation training to each shift of the Owner's personnel. Each training session shall be of duration acceptable to the Owner, and shall be conducted on shift or at a time acceptable to the Owner. Each session shall include an overview of the system and the devices connected to it, emergency procedures, and safety requirements. Each session shall include a complete demonstration of the system. Dates and times of each training period shall be coordinated through the Owner, not less than two (2) weeks prior to the training session.

3.6 Operating Instructions

- A. The Contractor shall provide Operating and User Instruction Manuals prior to testing of the system. Two (2) complete sets of operating and instruction manuals shall be delivered to the Owner upon completion.

3.7 Testing Instructions

- A. Upon completion of the installation, the Contractor shall deliver to the Owner complete, simple, comprehensive, step-by-step testing instructions giving recommended and required testing frequency of all equipment, and methods for testing each individual piece of equipment.
 - 1. At a minimum, the instructions must include all applicable sections of NFPA 25 and any relevant information provided by the equipment manufacturer.

3.8 Maintenance Instructions

- A. Prior to final acceptance, the Contractor shall provide two (2) complete sets of maintenance instructions to the Owner.
- B. Maintenance instructions shall be complete, easy to read, understandable, and shall provide the following information:
 - 1. Applicable sections of NFPA 25 covering maintenance of automatic sprinkler systems, deluge systems, and fire department standpipe and hose systems.

2. Maintenance instructions provided by manufacturers of the equipment and devices installed.

3.9 One Year Maintenance Contract

- A. The Contractor shall include as an add alternate, a one (1) year maintenance proposal covering the automatic fire sprinkler system and the fire department standpipe system. Inspection, testing, and maintenance shall be carried out in accordance with the applicable provisions of NFPA 25.
- B. The proposal shall include quarterly test/inspections for the entire system including the backflow preventer; the preparation and submittal of required test reports to local authorities and the payment of all fees associated with the filing of such reports; and required service, maintenance, and adjustment to systems components and equipment.
- C. The proposal shall include coordination with the fire alarm company and the City of Middletown Alarm Division with respect to the required testing of waterflow alarm and supervisory signals for control valves.

3.1 Warranty

- A. The Contractor shall warrant all systems components and equipment free from defects in materials and workmanship for a period of one (1) year from the date of final systems acceptance by the Owner and the authority having jurisdiction.

END OF SECTION 15325

SECTION 15410 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data for each type of plumbing fixture.
- C. Comply with requirements of Public Law 102-486, "Energy Policy Act," regarding water flow rate and water consumption of plumbing fixtures.
- D. Comply with applicable standards below:
 - 1. National Sanitation Foundation Construction: NSF 61.
 - 2. Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act."
 - 3. Public Law 102-486, "Energy Policy Act."

PART 2 - PRODUCTS

2.1 Toilet

- A. Toilet Bowl: Comfort height two-piece elongated toilet or comparable wall mount.
 - 1. Products:
 - a. Kohler Wellworth
 - 1) 30" x 18" x 29-1/4"
 - 2) 2-1/8" fully glazed trapway
 - 3) Class Five® flushing technology
 - 4) DryLock™ attachment plate
 - 5) KOHLER Comfort Height™
 - 6) 1.28 gpf High-Efficiency Toilets
 - 7) Meet strict flushing performance guidelines established by the EPA's (Environmental Protection Agency) WaterSense program
 - 8) Model # K-3998 (hand appropriate for install)
 - 9) Elongated bowl
 - b. Kohler Cimmaron
 - 1) 28-3/4"L x 17-5/8"W x 30-3/4"H
 - 2) Class Five® flushing technology
 - 3) DryLock™ attachment plate
 - 4) KOHLER Comfort Height™
 - 5) 1.28 gpf High-Efficiency Toilets
 - 6) Meet strict flushing performance guidelines established by the EPA's (Environmental Protection Agency) WaterSense program
 - 7) Model # K-3609 (hand appropriate for install)
 - 8) Elongated bowl
 - c. Kohler Kingston - ADA
 - 1) 26-1/2"L x 16-1/2"W x 13-3/4"H

- 2) Wall mount
- 3) Siphon jet
- 4) 1-1/2" rear spud
- 5) 1.28 gpf High-Efficiency Toilets
- 6) Meet strict flushing performance guidelines established by the EPA's (Environmental Protection Agency) WaterSense program
- 7) Model # K-4323
- 8) Elongated bowl
- d. Kohler Wellworth High Efficiency Bowl
 - 1) Elongated bowl
 - 2) Bedpan lugs
 - 3) 1-1/2" top spud
 - 4) 2-1/4" passageway
 - 5) 1.28 gpf
 - 6) 28-1/4" x 14-7/8" x 15"
- e. Kohler Bardon 1/8th GPF
 - 1) Vitreous china
 - 2) Washout
 - 3) 3/4" top spud
 - 4) 14" extended rim
 - 5) .0125 gpf
 - 6) Model # K-4909-ET

B. Toilet Seat: Kohler Stronghold:

1. Commercial toilet seat.
 - a. Solid polypropylene plastic
 - b. Elongated open front with cover, bumpers and hardware,
 - c. Check hinge
 - d. ADA compliant
 - e. Model # K-4731-C

C. Flushometer Valves & Float Valves:

1. Products:
 - a. Royal Model Flushometer: 111-1.28
 - b. Kohler Float Valve Kit, Model #30672 (Verify compatibility with existing toilets) or approved equal.

D. Toilet flush balls / flappers

1. Kohler flapper kit or approved equal.

2.2 Lavatory

A. Plastic Lavatory: Integral lavatory and countertop with backsplash - size as noted.

1. Products:
 - a. Cultured marble or solid surface material by Nevamar, Vermax or approved equal.
 - b. Color: To be selected by the Owner from manufacturer's standard colors.

B. Wall Mounted Vitreous China:

1. Products:

- a. American Standard Comrade 0124.024
 - 1) 20" x 18-1/4"
 - 2) Centers: 4" faucet centers
 - 3) Bowl: 15" x 10-7/8" bowl
 - 4) Soap Dish: One integral self-draining soap dish
 - 5) Rear Overflow
 - 6) Fast aligning one-piece wall hanger
- b. Gerber Model #12-314 PLYMOUTH 'Ledge Type'
 - 1) Size: 19" x 17" or size required to fit specific location.
 - 2) Centers: 4" faucet centers
 - 3) Bowl: 15" x 10 3/4" bowl
 - 4) Soap Dishes: Two integral self-draining soap dishes
 - 5) Back Overflow
 - 6) Fast aligning one-piece wall hanger

2.3 Faucets:

A. ASME A112.18.1M; Polished chrome finish, unless otherwise indicated. Maximum 2.5-gpm flow rate.

1. Products:

- a. Kitchen Faucets: Delta 120 single handle with no spray, 10" long spout 1/2" I.P.S. shanks 2.2 gpm V.R aerator
 - 1) Type: Widespread with inlets on 6-inch centers.
 - 2) Handle(s): Dual lever.
 - 3) Drain: Grid strainer.
 - 4) Trap: Chrome-plated, with slip-joint inlet and wall flange.
- b. Bathroom Faucets: Delta HDF series Model #515-WFHGMHDF: 4 1/2" long spout
 - 1) Type: 3-hole installation – 4" center set.
 - 2) Handle(s): Vandal resistant elbow handle with red/blue handle indicators.
 - 3) Drain: HDF series standard.
 - 4) Trap: Chrome-plated, with slip-joint inlet and wall flange.
- c. Owner Identified Bathrooms: Moen T6420 – Eva two handle widespread bathroom faucet; chrome finish.
 - 1) Type: 3-hole installation – 4" center set.
 - 2) Handle(s): Lever style; tapered.
 - 3) Drain: Matching drain assembly.
 - 4) Trap: Chrome-plated, with slip-joint inlet.

2.4 Tub / Shower:

A. Plastic Shower Enclosure: ANSI Z124.2 and ANSI Z124.2a;

1. Product: Sterling or approved equal

- 1) Size: To be determined based on field conditions.
- 2) Style: Neo-angle corner shower unit (Field Measure to Verify)
- 3) Style: Square shower unit (Field Measure to Verify)
- 4) Color: White

B. Shower Doors:

1. Products:
 - a. Door: Sterling or approved equal - Neo-Angle Deluxe Shower Doors (Pivot Hinge)
 - b. Door: Basco pivot hinge shower door
 - c. Door: Dreamline or approved equal bifold shower door
 - 1) Finish: Silver
 - 2) Glass: Tempered
 - 3) Glass Texture: Pebbled
 - 4) Size (Coordinate size with available space in bathroom and shower floor base)

C. Mixing-Valve Faucet and Miscellaneous Fittings: Single-lever antiscald-type faucet; maximum 1.5-gpm flow rate; and polished, chrome-plated finish; unless otherwise indicated.

1. Products for Woodframe houses:
 - a. Symmons 96-2X Temptrol tub and shower system. (S962X)
 - 1) Drain: Compatible w/ Temptrol tub and shower system.
 - 2) Temptrol Pressure-Balancing mixing valve with combination integral diverter and volume control
 - 3) Adjustable stop screw to limit handle turn
 - 4) Tub spout
 - 5) Clear-Flo shower head, arm and flange
 - 6) Internal service stops
 - 7) Flow-Control Fitting: 1.5 gpm (5.7 L/min) flow restrictor
 - b. Symmons 96-1X Temptrol valve shower w/stop (S961X)
 - 1) Pressure-Balancing mixing valve with integral volume control
 - 2) Integral service stops
 - 3) Adjustable stop screw to limit handle turn
 - 4) Clear-Flo shower head with arm and flange
 - 5) Flow-Control Fitting: 1.5 gpm (5.7 L/min) flow restrictor
2. Products for Dormitory use:
 - a. Symmons Safety Mix Model 1-100X with internal stops.

D. Shower Floor Base: Swanstone Veritek Retrofit Shower Floor (Size based on field measurements and available space in bathroom – coordinate with shower door size).

2.5 Kitchen Sinks:

A. Stainless-Steel Sink: Counter-mounting, self-rimming type – 20 gauge stainless steel.

1. Products:
 - a. Woodframe Houses: Elkay Pacemaker Model PSR3322 double bowl sink (No sprayer).
 - b. Drain(s): Stainless steel strainer bucket.

2.6 Accessories:

1. Products:
 - a. Apollo Valves
 - 1) Provide hot and cold water shut off valves on all supply piping
 - b. Provide wall eschutcheons at all penetrations through wall.

PART 3 - EXECUTION

3.1 INSTALLATIONS

- A. Install fitting insulation kits on fixtures for people with disabilities.
- B. Install fixtures with flanges and gasket seals.
- C. Install flushometer valves for accessible water closets with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- D. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- E. Fasten wall-hanging plumbing fixtures securely to supports attached to building substrate when supports are specified, and to building wall construction where no support is indicated.
- F. Fasten floor-mounted fixtures to substrate. Fasten fixtures having holes for securing fixture to wall construction, to reinforcement built into walls.
- G. Fasten wall-mounted fittings to reinforcement built into walls.
- H. Fasten counter-mounting plumbing fixtures to casework.
- I. Secure supplies to supports or substrate within pipe space behind fixture.
- J. Set shower receptors and mop basins in leveling bed of cement grout.
- K. Install individual supply inlets, supply stops, supply risers, and tubular brass traps with cleanouts at fixture.
- L. Install water-supply stop valves in accessible locations.
- M. Install traps on fixture outlets. Omit traps on fixtures having integral traps. Omit traps on indirect wastes, unless otherwise indicated.
- N. Install escutcheons at wall, floor, and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons where required to conceal protruding pipe fittings.
- O. Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color.
- P. Install piping connections between plumbing fixtures and piping systems and plumbing equipment. Install insulation on supplies and drains of fixtures for people with disabilities.
- Q. Ground equipment. Tighten electrical connectors and terminals according to UL 486A and UL 486B.

END OF SECTION 15410

SECTION 15830 - FANS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submit Product Data including certified test data to Owner prior to purchasing.
- C. Submit vent and duct routing locations for approval.

PART 2 - PRODUCTS

2.1 FANS

A. Bathroom Exhaust Fan:

1. Products:

a. NuTone

- 1) Ultra Silent Series Fan/Light
- 2) Model QTREN110FLT
- 3) 110 CFM
- 4) 1.3 Sones
- 5) 4" ducting
- 6) Energy Star qualified and Title 24 Compliant
- 7) 42 W Fluorescent lighting – bulb included
- 8) 4W nightlight (bulb sold separately – Contractor to provide)
- 9) UL Listed for use over tub/shower with GFCI circuit
- 10) Grille Dimension: 13" x 14"

b. NuTone

- 1) Ultra Silent Series Fan
- 2) Model TREN110
- 3) 110 CFM
- 4) 1.3 Sones
- 5) 4" ducting
- 6) Energy Star qualified and Title 24 Compliant
- 7) UL Listed for use over tub/shower with GFCI circuit
- 8) Grille Dimension: 13" x 14"

c. Panasonic

d. Broan

e. Approved equal.

- 2. Must be Energy Star rated.
- 3. Housing Material: Cold rolled steel, galvanized.
- 4. Sones: 2.0 or less.
- 5. CFM: 100 or greater; sized appropriately for location or as specified.

6. Interior Grille Finish: White polymeric.
7. Exterior Grille Finish: Bronzestone or as specified by Owner and building exterior finish.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Replace existing fan with new fan. Provide additional framing as required for proper installation. Provide duct fittings as required for proper connection. Patch & paint upon completion of installation. Provide all required electrical work for a complete installation. If not vented to exterior, provide all materials necessary to vent through wall or roof depending upon existing field conditions. Verify venting location and routing with owner prior to the start of work.
- B. For new fan installation, coordinate location and installation with duct installation and installation of other ceiling and wall-mounted items. Vent to exterior through wall or roof depending upon existing field conditions. Verify venting location and routing with owner prior to the start of work.
- C. Installation shall include all required ducts, transitions and elbows. Roof, wall and eave caps shall also be included. All accessories noted shall be by manufacturer selected or equal manufacturer.
- D. Provide all required electrical work for a complete installation.
- E. All ducting must comply with local and national building codes.

END OF SECTION 15830

SECTION 16050 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data, Shop Drawings, Samples
- B. Coordinate Arrangement, Mounting, and Support of Electrical Equipment:
 - 1. Allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. Provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. Allow right of way for piping and conduit installed at required slope.
 - 4. Ensure that connecting raceways, cables, wireways, cable trays, and busways are clear of obstructions and of the working and access space of other equipment.
- C. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- D. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 RACEWAYS AND CONDUCTORS

- A. Raceways:
 - 1. EMT: ANSI C80.3, zinc-coated steel, with set-screw or compression fittings.
 - 2. FMC: Zinc-coated steel.
 - 3. IMC: ANSI C80.6, zinc-coated steel, with threaded fittings.
 - 4. LFMC: Zinc-coated steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
 - 5. RNC: NEMA TC 2, Schedule 40 PVC, with NEMA TC3 fittings.
 - 6. Raceway Fittings: Specifically designed for raceway type used in Project.
- B. Conductors:
 - 1. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.
 - 2. Conductors, Larger Than No. 10 AWG: Stranded copper.
 - 3. Insulation: Thermoplastic, rated at 75 deg C minimum.
 - 4. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

2.2 ELECTRICAL IDENTIFICATION MATERIALS

- A. Raceway Identification Materials:

1. Snap-around, color-coding bands; flexible, pre-printed, color-coded acrylic.
 2. Self-adhesive, color-coding vinyl tape; flexible, pre-printed, self-adhesive vinyl.
- B. Conductor Identification Materials:
1. Color-Coding Conductor Tape: Self-adhesive vinyl tape 1 to 2 inches wide.
- C. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, polyethylene tape with continuous metallic strip or core.
- D. Tape Markers for Wire: Vinyl, self-adhesive, wraparound type with pre-printed numbers and letters.
- E. Warning Labels and Signs: Baked-enamel, pre-printed signs, punched or drilled for fasteners; with colors, legend, and size required for application.
- F. Equipment Identification Labels: Engraved, laminated acrylic or melamine label; punched or drilled for screw mounting. White letters on a dark-gray background; red letters for emergency systems.
1. Fasteners: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

2.3 SUPPORT AND ANCHORAGE COMPONENTS

- A. Steel Slotted Support Systems: MFMA-3, factory-fabricated components for field assembly.
- B. Raceway and Cable Supports: As described in NECA 1.
- C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and fittings.
- D. Pipe Sleeves: Schedule 40, galvanized steel, plain ends.
- E. Mounting, Anchoring, and Attachment Components:
1. Powder-Actuated Fasteners: Threaded-steel stud.
 2. Expansion Anchors: Steel, insert-wedge type, for use in concrete.
 3. Concrete Inserts: Steel or malleable-iron slotted-support-system units.
 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 5. Through Bolts: Structural type, hex head, high strength; comply with ASTM A 325.
 6. Toggle Bolts: All-steel springhead type.
 7. Hanger Rods: Threaded steel.

2.4 SEISMIC-RESTRAINT COMPONENTS

- A. Rated Strength, Features, and Application Requirements for Restraint Components: As defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Strength in tension, shear, and pullout force of components used shall be at least five times the maximum seismic forces to which they will be subjected.
- B. Angle and Channel-Type Brace Assemblies: Steel angles or steel slotted-support-system components; with accessories for attachment to braced component at one end and to building structure at the other end.
- C. Cable Restraints: ASTM A 603, zinc-coated, steel wire rope attached to steel or stainless-steel thimbles, brackets, swivels, and bolts designed for restraining cable service.
 1. Seismic Mountings, Anchors, and Attachments: Select to resist seismic forces.
 2. Hanger Rod Stiffener: Steel slotted-channel support clamped to hanger rod.
 3. Bushings for Floor- and Wall-Mounted Equipment Anchors: Neoprene units designed for seismically rated rigid equipment mountings.
- D. Sleeve Seals: Modular, to fill annular space between sleeve and raceway or cable; EPDM interlocking links with pressure plates, and connecting bolts and nuts.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Sleeve and Sleeve Seals: Use type and number of sealing elements recommended by manufacturer; comply with NECA 1.
- B. Woodframe bedrooms: Circuit breakers shall be 20 amp, arc fault. Maximum 2 receptacles per breaker.
- C. Kitchens/Bathrooms/Dining Rooms: Circuit breakers shall be 20 amp, receptacles shall be GFI.

3.2 RACEWAY APPLICATION

- A. Outdoor Installations:
 1. Exposed or Concealed: IMC.
 2. Underground, Single Run: RNC.
 3. Connection to Vibrating Equipment: LFMC.
 4. Boxes and Enclosures: Metallic, NEMA 250, Type 3R or Type 4.
- B. Indoor Installations:
 1. Exposed or Concealed: EMT.
 2. Connection to Vibrating Equipment: FMC; in wet or damp locations, use LFMC.
 3. Damp or Wet Locations: IMC.
 4. Boxes and Enclosures: Metallic, NEMA 250, Type 1, unless otherwise indicated.

3.3 RACEWAY AND CABLE INSTALLATION

- A. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
- B. Install raceways and cables at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.
- C. Install raceways embedded in slabs in middle third of slab thickness where practical, and leave at least 1-inch-thick concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 - 2. Space raceways laterally to prevent voids in concrete.
 - 3. Install conduit larger than 1-inch trade size parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
 - 4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.
- D. Install pull wires in empty raceways.
- E. Install telephone and signal system raceways, 2-inch trade size and smaller, in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent.
- F. Connect motors and equipment subject to vibration, noise transmission, or movement with a 72-inch maximum length of flexible conduit. Install LFMC in wet or damp locations.

3.4 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

- A. Feeders: Type THHN/THWN insulated conductors in raceway.
- B. Underground Feeders and Branch Circuits: Type THWN or single-wire, Type UF insulated conductors in raceway.
- C. Branch Circuits: Type THHN/THWN insulated conductors in raceway.
- D. Branch Circuits: Type THW or THHN/THWN insulated conductors in raceway where exposed. Metal-clad cable where concealed in ceilings and gypsum board partitions.
- E. Branch Circuits: Type THW or THHN/THWN insulated conductors in raceway where exposed. Armored or nonmetallic sheathed cable where permitted by authorities having jurisdiction and where concealed in ceilings and gypsum board partitions.
- F. Remote-Control Signaling and Power-Limited Circuits: Type THHN/THWN insulated conductors in raceway for Classes 1, 2, and 3, unless otherwise indicated.

3.5 APPLICATION OF IDENTIFICATION MATERIALS

- A. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive color coding tape-in bands:

1. Fire Alarm System: Red.
 2. Security System: Blue and yellow.
 3. Telecommunication System: Green and yellow.
- B. Power-Circuit Conductor Identification: For No. 3 AWG conductors and larger, at each location where observable, identify phase using color-coding conductor tape.
- C. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring.
- D. Warning Labels for Enclosures for Power and Lighting: Comply with 29 CFR 1910.145; identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
- E. Equipment Identification Labels:
1. Labeling Instructions: Provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label.
 2. Equipment to Be Labeled:
 - a. Panelboards.
 - b. Electrical switchboards.
 - c. Transformers.
 - d. Motor starters.
 - e. Push-button stations.
 - f. Contactors.
 - g. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.
 - 1) Data Outlets shall be Hubbel
 - a) 3 Cat6 wires, no Coax.
 - b) One of the Cat 6 wires to be white, 2 to be blue.
 - c) Blue wires get terminated with Orange hubble cat6 jacks, white gets terminated with white or Ivory hubble cat6 jack

3.6 INSTALLATION OF IDENTIFICATION MATERIALS

- A. Verify identity of each item before installing identification products.
- B. System Identification Color Banding for Raceways and Cables: At 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- C. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Ungrounded service, feeder, and branch-circuit conductors.
1. 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.

2. 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points.
- D. Underground-Line Warning Tape: Continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade.

3.7 INSTALLATION OF SUPPORTS

- A. Multiple Raceways or Cables: Install on trapeze-type supports fabricated with steel slotted channel.
- B. Install seismic-restraint components using methods approved by the evaluation service providing required submittals for component.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.8 SEISMIC REQUIREMENTS

- A. Installation Of Seismic-Restraint Components:
 1. Install bushing assemblies for anchor bolts for wall- and floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in substrate.
 2. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, upper truss chords of bar joists, or at concrete members.
- B. Accommodation of Differential Seismic Motion: Make flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross expansion and seismic-control joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to electrical equipment that is anchored to a different structural element than the one supporting them as they approach equipment.

3.9 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

END OF SECTION 16050

SECTION 16140 - WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data, Samples.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 DEVICES

- A. General: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Color: Ivory, Brown, Gray, or White. Submit color options to Owner for review and final color selection for each project.
- C. Receptacles: Heavy or General-Duty grade, NEMA WD 1, NEMA WD 6, DSCC W-C-596G, and UL 498 depending upon service and code requirements or as noted on the drawings or scope of work.
- D. Ground-Fault Circuit Interrupter Receptacles: GFCI with integral duplex receptacle complying with UL 498 and UL 943; for installation in a 2-3/4-inch- deep outlet box without an adapter.
- E. Arc-Fault Circuit Interrupter Breakers: To be installed for all circuits feeding the bedrooms in accordance with the requirements outlined in the National Electric Code.
- F. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible frequency and EMI/RFI filters.
 - 1. Control: Continuously adjustable slider; with single-pole or three-way switching to suit connections.
 - 2. Incandescent Lamp Dimmers: Modular, 120 V, 60 Hz with continuously adjustable rotary knob, toggle switch, or slider; single pole with soft tap or other quiet switch; EMI/RFI filter to eliminate interference; and 5-inch wire connecting leads.
 - 3. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.
- G. Automatic Wall Switch (motion sensors)
 - 1. Shall be installed in all common corridors and at top of stairs where fixtures are installed.
 - 2. Products:

- a. The Wattstopper – Model shall be selected based on location and appropriate function (ceiling or wall mounted as required);
 - b. Model #WS-200, CW-100, CI-200, DT 200, DT 300 appropriate for the installation and as approved by Owner (www.wattstopper.com).
- H. Wall Plates, Finished Areas: Smooth, high-impact thermoplastic, Ribbed plastic, Satin-finish stainless steel, Brushed brass, lacquered or Polished brass, lacquered; fastened with metal screws having heads matching plate color. Submit color options to Owner for review and final color selection for each project.
- I. Wall Plates, Unfinished Areas: Smooth, high-impact thermoplastic with metal screws.
- J. Wall Plates, Wet Locations: Thermoplastic or Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet locations. Submit options to Owner for review and final approval.
- K. Floor Service Fittings
- 1. Modular, flush-type, dual-service units suitable for wiring method used.
 - 2. Service Plate: Rectangular or Round, die-cast aluminum with satin finish. Review options with Owner for final approval.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install devices and assemblies plumb, level, and square with building lines.
- B. Install unshared neutral conductors on line and load side of dimmers.
- C. Mount devices flush, with long dimension vertical, and grounding terminal of receptacles on top, unless otherwise indicated. Group adjacent devices under single, multi-gang wall plates.
- D. Install in entry halls and common corridor fixtures. May require installation of 2 units to provide sufficient coverage.

END OF SECTION 16140

SECTION 16500 - LIGHTING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Division 1 - General Requirements is made a part of this section.
- B. Submittals: Product Data for each luminaire, including lamps.
- C. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Coordinate ceiling-mounted luminaires with ceiling construction, mechanical work, and security and fire-prevention features mounted in ceiling space and on ceiling.
- E. Program houses with 7 or more occupant must have emergency lighting installed.

PART 2 - PRODUCTS

2.1 LUMINAIRES

- A. Fixture:
 - 1. Products, Interior Lighting: Reference drawings for all lighting and fixtures.
LOCATION: Bedrooms, Common Rooms, Dining Rooms, Living Rooms, Kitchens
 unless otherwise noted/directed by Owner.
 - a. Incon Lighting – Model #11911-413QE-ES; 19” Diameter.
 (www.inconlighting.com) Ph. #800-393-5630, New England Lighting Incorporated – 119 Series or approved equal.
 - 1) Wattage: (4) 13 Watt quad; lamps included
 - 2) Ballast: Electronic
 - 3) Lens Type: UV stabilized white translucent acrylic
 - 4) Housing/Finish: Steel spun powder coated white
 - 5) Options: Energy Star
 - LOCATION: Woodframe Corridors** (or as noted/directed by Owner)
 - b. Incon Lighting – Model #11411-213QE-ES; 14” Diameter.
 (www.inconlighting.com) Ph. #800-393-5630, New England Lighting Incorporated - 114 Series or Approved Equal.
 - 1) Wattage: (2) 13 Watt quad; lamps included
 - 2) Ballast: Electronic
 - 3) Lens Type: UV stabilized white translucent acrylic
 - 4) Housing/Finish: Steel spun powder coated white
 - 5) Options: Energy Star
 - LOCATION: Bathroom Ceilings** (or as noted/directed by Owner)
 - c. Incon Lighting – Model #11411-213QE-ES; 14” Diameter.
 (www.inconlighting.com) Ph. #800-393-5630, New England Lighting Incorporated - 114 Series or Approved Equal.
 - 1) Wattage: (2) 13 Watt quad; lamps included
 - 2) Ballast: Electronic

- 3) Lens Type: UV stabilized white translucent acrylic
- 4) Housing/Finish: Steel spun powder coated white
- 5) Options: Energy Star

LOCATION: As noted/directed by Owner

- d. Incon Lighting – Model #11111-213QE-ES; 11” Diameter.
(www.inconlighting.com) Ph. #800-393-5630, New England Lighting Incorporated - 114 Series or Approved Equal.
 - 1) Wattage: (2) 13 Watt quad; lamps included
 - 2) Ballast: Electronic
 - 3) Lens Type: UV stabilized white translucent acrylic
 - 4) Housing/Finish: Steel spun powder coated white
 - 5) Options: Energy Star

LOCATION: Above bathroom medicine cabinets

- e. Incon 520 Series or approved equal.
 - 1) Housing/Finish: White finished cold rolled steel with white end caps
 - 2) Length: 24.25” or 48.25” as required for the installation
 - 3) Lamps: (2) 17W T8 electronic, contractor to provide
 - 4) Ballast: 120 V, normal power factor, Class P
 - 5) Lens: Smooth white UV stabilized acrylic
 - 6) Options: Energy Star
 - 7) Wire to wall switch

LOCATION: Under Cabinet (or as noted/directed by Owner)

- f. Simkar Corporation – Series UW Task Lighting, Post Painted, Electronic Start.
(www.simkar.com) Ph. #800-523-3602
 - 1) Lamps: (1) 17W 24” T8
 - 2) Ballast: Electronic T8, high ballast factor
 - 3) Option: LA
 - 4) Wire to wall switch

g. LOCATION: Closets

- 1) N-Vision
- 2) 17W - Compact Fluorescent Light Bulb – Dome Cover
- 3) Energy Star
- 4) Wire to wall switch

LOCATION: 171 CHURCH STREET

h. Hallway / Stairtower

- 1) Incon 197 Series Close-to-Ceiling 21” decorative fixture
 - a) Lense: White Acrylic (LENS-1976)
 - b) Finish: White
 - c) Lamps: (3) 26 W, GU-24
 - d) Ballast: 120V 60 Hz Electronic NPF
 - e) Options: 50K / Energy Star
 - f) Wire to wall switch

i. Bathroom

- 1) Incon 196 Series Close-to-Ceiling 17” decorative fixture
 - a) Lense: White Acrylic (LENS-1961)
 - b) Finish: White

- c) Lamps: (2) 26 W, GU-24
- d) Ballast: 120V 60 Hz Electronic NPF
- e) Options: 50K / Energy Star
- f) Wire to wall switch

LOCATION: CFA A REHEARSAL HALL

j. **Control Room 013**

- 1) **Axis Cubic Surface Mount Solid Ceiling; Narrow – SUBJECT TO CHANGE**
 - a) Optics:
 - b) Finish: White
 - c) Lamps: T-5
 - d) Lamp configuration: 2 lamp
 - e) Voltage: Universal
 - f) Ballast: Electronic rapid start
 - g) Wire to wall switch with occupancy sensor
- 2) Lightolier Lytespan surface mounted track lighting
 - a) Lense:
 - b) Finish: White
 - c) Lamps:
 - d) Ballast:
 - e) Options:
 - f) Wire each side to wall switch
- 3) **Surface mounted Can Fixture – TO BE DETERMINED**
 - a) Lense:
 - b) Finish: White
 - c) Lamps: LED
 - d) Ballast:
 - e) Options:
 - f) Wire to wall switch

LOCATION: Basement (or as noted/directed by the owner)
17W - Compact Fluorescent Light Bulb – Dome Cover

k. **LOCATION: HIGH MOISTURE SHOWER ROOMS:**

- 1) Columbia Model FNPV
- 2) Length: 4'-0"
- 3) Lamps: (2) 32W T8
- 4) Ballast: Electronic T8
- 5) Voltage: 120V
- 6) Lens: TBD, (review w/ Owner per location).
- 7) Accessories: As required based on location.

2. Products, Exterior Lighting:

- a. **LOCATION: Exterior Porch Lights for Woodframes:** (style dependent upon installation application)

INCON LIGHTING:

Series 3259 – Model Number 32515-26QE-ES PE: Black hood, white lens, 35K lamp included, wet location listed, insect resistant, photo cell, Energy Star.

INCON LIGHTING:

Series 304 – Model Number 30415-13QE-ES PE: Black hood, white lens, lamp included, damp location listed, photo cell, Energy Star.

INCON LIGHTING: Ceiling Mounted

Series 127 – Model Number 127-9-1-13QE-ES PE: White finish, clear prismatic polycarbonate lens, damp location listed, photo cell, lamps included, Energy Star.

Designers Edge:

Model #L-80-13W-BR - One-light downward wall sconce, bronze with acrylic prismatic lens globe, electronic ballast, lamp included, dusk to dawn photocell

- b. **Pole Light Fixtures**

- 1) Architectural Area Lighting
- 2) EEL Sansi LED Street Light Series

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set units level, plumb, and square with ceiling and walls, and secure.
- B. Lamping: Where specific lamp designations are not indicated, lamp units according to manufacturer's written instructions.
- C. Clean and relamp existing fixtures.
- D. Any ceiling with a pull string shall be wired for switch at entry, includes but not limited to bedrooms, basements etc.
- E. Contractor to provide concrete bases where required when installing exterior pole light fixtures.

END OF SECTION 16500

SECTION 16722: WOODFRAMES - INTELLIGENT REPORTING FIRE DETECTION SYSTEM

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section of the specifications includes the furnishing, installation, and connection of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances and wiring as specified herein.
- B. The fire alarm system shall comply with requirements of National Fire Protection (NFPA) Standard No. 72 for protected premises signaling systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.
- C. The system shall be an active/interrogative type system where each transponder and/or addressable device is repetitively scanned, causing a signal to be transmitted to the main fire alarm control panel (FACP) indicating that the device and its associated circuit wiring is functional. Loss of this signal at the main FACP shall result in a trouble indication as specified hereinafter for the particular input.
- D. The FACP and peripheral devices shall be manufactured 100% by a single U.S. manufacturer (or division thereof).
- E. The system as specified shall be supplied, installed, tested and approved by the Owner, Owner's Insurance Co. and the office of the Middletown Fire Marshal (Authority Having Jurisdiction), and turned over to the owner in an operational condition.

1.2 SCOPE OF WORK

- A. A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance with the specifications and drawings.
- B. Basic Performance
 - 1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto an NFPA Style 4 (Class B) Signaling Line Circuit (SLC).
 - 2. Initiation device circuits shall be wired Class B (NFPA Style B).
 - 3. Notification Appliance Circuits shall be wired Class B (NFPA Style Y).
 - 4. Digitized electronic signals shall employ check digits or multiple polling.
 - 5. A single ground or open on any system signaling line circuit, initiating device circuit, or notification appliance circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
 - 6. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.

7. Manufacturer's Representative
 - a. Contractor's personnel shall have a minimum of 2 year's experience in service and maintenance of fire detection, and alarm systems.
 - b. Equipment shall be supplied by Siemens Fire Safety Division, 104 Sebeth Drive, Cromwell, CT 06416, or approved equal.

1.3 BASIC SYSTEM FUNCTIONAL OPERATION

1. Activation of any system fire, security, supervisory, trouble, or status initiating device shall cause the following actions and indications at all network Person Machine Interfaces using basic graphics and multiple detail screens. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards.
 - a. National Fire Protection Association (NFPA) 72 National Fire Alarm Code and NFPA 101 Life Safety Code.
2. All door holdback devices to de-energize to cause all associated fire doors to close.
3. PMI displays on main fire alarm control and all secondary panels with LCD displays shall display alarm condition, device initiating the alarm and location of device.
4. **Transmit alarm condition to central alarm monitoring company via addressable digital dialer (DACT). Coordinate with Owner for exact requirements and provisions necessary for a complete interface.**
5. Activation of any smoke detector, pull station, heat detector or water flow device shall cause all of the above to occur, plus it shall cause its integral alarm lamp to be energized until the alarm condition of the detector has been reset.
6. Activation of any smoke detector, pull station, heat detector or water flow device shall activate audible bases in all bedrooms as well as all notification appliances.
7. Sprinkler Supervisory Devices and Carbon Monoxide detectors: The activation of any sprinkler supervisory tamper switch or carbon monoxide detectors shall activate the system supervisory service audible signal and cause a discrete LCD readout to indicate supervisory condition at the control panel. Differentiation between valve - tamper activation or carbon monoxide detector activation and opens and/or grounds on the initiation circuit shall be provided. Pressing the supervisory service acknowledge key shall silence the supervisory audible signal while maintaining the supervisory discrete LCD display indication condition. Restoring the valve to the normal position or resetting the carbon monoxide detector shall cause restoration of the fire alarm system to normal.
8. Any alarms shall be displayed on an 80 character LCD display. The top line of 40 characters shall be the point label and the second line shall be the device type identifier. The system alarm LED shall flash on the control panel until the alarm has been acknowledged. Once acknowledged, this same LED shall latch on. A subsequent alarm received from another zone shall flash the system alarm LED on

- on the control panel.
9. The LCD display shall show the alarm information. The remote status panel shall mimic the control panel operation.
 10. Each building will be programmed for selective building activation.
- B. Shop Drawings: Indicate and provide system wiring diagram showing each device and wiring connection required, as well as a complete parts list of required equipment.
- C. Software Modifications
1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours for a fire/life safety emergency, or within 24 hours for a system trouble.
 2. Provide all hardware, software, programming tools and documentation necessary to modify the existing fire alarm system communications device on site to the new face. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.
- D. Battery calculations for each complete system, including all fire alarm control panel components and peripheral devices.
- E. Three (3) sets of catalog cut sheet information and a detailed riser drawing.
1. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst-case condition plus 25% spare capacity.
 2. Complete drawings covering the following shall be submitted by the contractor for the proposed system:
 - a. The submittals shall include drawings (in CAD compatible format) showing a schematic arrangement of the system including the main control unit and all peripherals. The drawing shall show the type, quantity and arrangement of all modular components within the control unit and shall indicate overall cabinet dimensions. The drawings shall show explicit details regarding the positioning and placement of all detection system components. The drawing shall also include building floor plans drawn to a minimum scale of 1/8" = 1'-0".
 - b. Floor plans shall show all equipment and raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code fill used.
 3. Installation drawings, shop drawings, and as-built drawings shall be prepared by an individual who is experienced with the work specified herein.

F. Certifications

1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.4 GUARANTEE

- A. All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.5 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification. The publications are referenced in text by the basic designation only. The project is governed by the edition of the code that has been adopted at the time of the commencement of the project.

A. National Fire Protection Association (NFPA):

1. No. 70 National Electric Code (NEC)
2. No. 72 National Fire Alarm Code
3. No. 101 Life Safety Code

B. Underwriters Laboratories Inc. (UL):

1. No. 50 Cabinets and Boxes
2. No. 268 Smoke Detectors for Fire Protective Signaling Systems
3. No. 268A Smoke Detectors (HVAC).
4. No. 864 Control Units for Fire Protective Signaling Systems
5. No. 521 Heat Detectors for Fire Protective Signaling Systems
6. No. 228 Door Closers-Holders for Fire Protective Signaling Systems
7. No. 464 Audible Signaling Appliances
8. No. 38 Manually Actuated Signaling Boxes
9. No. 346 Waterflow Indicators for Fire Protective Signaling Systems
10. No. 1481 Power supplies for Fire Protective Signaling Systems
11. No. 1971 Visual Notification Appliances

C. Local and State Building Codes

- D. All requirements of the Owner, Owner's insurance company and the City of Middletown Fire Marshal's office (Authority Having Jurisdiction).

1.6 RELATED SECTIONS – if used on this project

- A. Section 01015: General Project Requirements
- B. Section 01700: Project Closeout
- C. Section 01740: Warranties and Bonds
- D. Section 15325: Fire Sprinkler Systems
- E. Section 16050: Basic Electrical Materials and Methods

PART 2 - PRODUCTS

1.7 EQUIPMENT AND MATERIAL, GENERAL

- A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approval agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.
- B. All equipment and components shall be installed in strict compliance with the manufacturer's recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation. Refer to the Riser/Connection diagram for all specific system installation/termination/wiring data.
- C. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

1.8 CONTROL PANEL

- A. The control panel shall be modular in construction and shall include, but not limited to; the hardware, software and firmware required to perform the following major system functions:
 - 1. Steel, satin black, baked enamel cabinet with indicator viewing window, removable hinged outer door with cylinder lock and dead front construction with the outer door open. The inner dead front doors shall be hinged for ease of system operation by firefighters and access by technicians for testing and maintenance modes.
 - 2. System power supplies, including necessary transformers rectifiers, regulators, filters and surge protection required for system operation, with the capacity to power the system in a worst case condition with all devices in alarm and all local indicating appliances active without exceeding the listed ratings. All system devices shall display normal and alarm conditions consistently whether operating from normal power or reserve (standby) power.

3. Surge protection shall be supplied at the power input to each cabinet. The surge suppression shall be of the phase to neutral (normal mode suppression). Phase to ground devices, MOV based devices and pure inductive devices shall not be considered acceptable. Protection shall also be furnished for SLC and NAC circuits where exiting and entering any structure, connected prior to any system devices within the structure.
4. System 16 bit core processor, with internal operating system to process incoming alarm signals and issue output commands required as a result of the alarm reception, by system programming or by manual commands. Total system response time shall not exceed 10 seconds on a system configured to the 240 maximum input address maximum capacity. All system processors shall be supervised by individual watchdog circuitry furnishing automatic restart after loss of activity. Systems with a single watchdog circuits for all processors shall not be acceptable unless supplied with a "hot" standby CPU.
5. Capability shall exist within the system to extend the network at any node to the systems maximum capacity.
6. Selective historical log, up to 800 events of all types, shall be stored in flash memory and displayed, printed or downloaded by classification for selective event reports.
 - a. The system shall allow selection of events to be logged, including inputs such as: alarms, troubles, supervisory signals, status changes, walk tests and device verification; and such outputs as: audible control and output activation; and actions such as: resets, sensitivity adjustments, arm/disarm, overrides, time and date setting and acknowledgements.
 - b. Data format for downloading shall be adaptable to a data base management program allowing custom report generation to track alarms, troubles and maintenance.
 - c. Audible and visual indications shall be generated when memory is 80% and 90% full to allow downloading of data.
 - d. Systems not supporting downloading of event history or requiring segregated storage for classifications of event history shall include a PC based, dedicated historical logging terminal together with hard drive storage and necessary software for system performance analysis and report generation.
7. System display/keyboard shall be usable at any network node and shall have the following capabilities, capacities, indicators and controls:
 - a. An 80-character back lighted alphanumeric super twist LCD display readable at any angle.
 - b. Thirty-two character user defined custom messages shall describe the location of the active device.

- c. Display shall indicate desired message in a sequence, including; English, English/Spanish. Either of the selected languages shall be selectable as the primary display.
 - d. Systems unable to perform to this level shall supply PC based terminals displaying the required messages.
 - e. The system shall be capable of programming to allow troubles occurring and restored in the system to be automatically removed from the display queue.
 - f. As a minimum, an LED display for "ALARM", "AUDIBLES SILENCED", "SUPERVISORY", "TROUBLE", "SECURITY", "POWER ON" and "PARTIAL SYSTEM DISABLED".
 - g. Touch activated, audible feedback, membrane switches for "ALARM ACKNOWLEDGE", "AUDIBLE SILENCE", "SUPERVISORY ACKNOWLEDGE", "TROUBLE ACKNOWLEDGE", "SECURITY ACKNOWLEDGE", "RESET", "DISPLAY HOLD" and "DISPLAY NEXT".
 - h. Touch activated, audible feed-back, membrane switch functions, programmable to perform a minimum of twelve custom designed and programmed functions such as drill, disable, bypass automatic control commands or other special functions as required by the system user.
 - i. The membrane switches shall also be used for the entry of multiple key sequences to be used for pass code protection inputs into logic strings, preventing un-authorized command entry.
 - j. Ten-digit keypad for pass code entry to perform programming and maintenance functions.
8. The system shall have capabilities allowing vectored reporting of Alarms, Supervisory, Security, Troubles and Status, to dedicated alphanumeric radio pagers. The information displayed on the pager shall identify the system, the device address, and the state of the device and the alphanumeric description of the device location. The system shall have capabilities of up to eight classifications of remote reports.

1.9 POWER SUPPLY

- A. System power supply, including necessary transformers rectifiers, regulators, filters and surge protection required for system operation, with the capacity to power the system in a worst case condition with all devices in alarm and all local indicating appliances active without exceeding the listed ratings. All system devices shall display normal and alarm conditions consistently whether operating from normal power or reserve (standby) power.
- B. Surge protection shall be supplied at the power input to each cabinet. The surge suppression shall be of the phase to neutral (normal mode suppression). Phase to ground devices, MOV based devices and pure inductive devices shall not be considered acceptable. Protection shall also be furnished for SLC and NAC circuits where exiting and entering any structure, connected prior to any system devices within the structure.

- C. Standby power source shall meet the requirements for standby capacity as detailed in NFPA 72, i.e. supervisory for 24 hours and sufficient power to provide the required discharge, control and notification.
- D. Transfer from AC to battery power shall be instantaneous when AC voltage drops to a point where it is not sufficient for normal operation.
- E. Transfer to battery standby shall be indicated by display and recorded in the history file with time and date. Indication shall be "AC POWER FAILURE". During battery operation, system shall process all inputs. However, LCD display shall provide five (5) seconds of backlighting for each new input condition, and then turn off LCD back light to conserve battery power. System charger shall provide recharge of batteries to full capacity in 48 hours.

1.10 SYSTEM ENCLOSURES

- A. Provide the enclosure needed to hold all the cards and modules as specified with at least spare capacity for two cards. The enclosures shall be black. The outer doors shall be capable of being a left hand open or a right hand open. The inner door shall have a left hand opening. System enclosure doors shall provide ventilation for the modules or cards in the enclosure where required.

1.11 CONDUIT AND WIRE

A. Conduit and Metal Raceway

1. Conduit shall be in accordance with the National Electrical Code (NEC), local and state requirements, including City of Middletown Fire Prevention Ordinance.
2. All wiring shall be installed in conduit or metal raceway. Conduit fill shall not exceed 40% of interior cross sectional area where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or backboxes, except where conduit entry is specified by the fire alarm control panel manufacturer.
6. Conduit shall be 3/4" (19.1 mm) minimum. Metal raceway shall be sized according to the number of required conductors.

B. Wire

1. All fire alarm system wiring must be new.

2. Wiring shall be in accordance with local, state and national codes (e.g., NFPA 70, NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for initiating device circuits and signaling line circuits, and 14 AWG (1.63 mm) for notification appliance circuits.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
5. Wiring used for the multiplex communication loop shall be twisted and shielded and installed in conduit unless specifically approved by the fire alarm equipment manufacturer. The system should permit use of IDC and NAC wiring in the same conduit with the communication loop.
6. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; a trouble signal will be activated until the system and its associated field wiring are restored to normal condition.
7. The Fire Alarm Control panel shall be capable of T-Tapping Class B (NFPA Style 4) Signaling Line Circuits. Systems which do not allow, have restrictions to, for example, the amount of T-Taps, length of T-Taps etc., are not acceptable.

C. Terminal Boxes and Junction Boxes

1. All boxes and cabinets shall be UL listed for their use and purpose.

1.12 MAIN FIRE ALARM CONTROL PANEL

- A. The main FACP is either existing to be upgraded and expanded, or if a replacement is specified, the new equipment shall be Siemens FS-250, no substitutions.

1.13 SYSTEM COMPONENTS

A. Strobe Lights:

1. Shall meet the requirements of the ADA as defined in UL standard 1971 and shall meet the following criteria:
 - a. The maximum pulse duration shall be 2/10 of one second.
 - b. Candela intensity shall meet the requirements of UL 1971.
 - c. The flash rate shall meet the requirements of UL 1971.
 - d. The appliance shall be placed 80 in (2,030 mm) above the highest floor level within the space, or 6 in (152 mm) below the ceiling, which ever is lower.

2. Provide flush or semi-flush mounted visual units.

B. Audible/Visual Combination Devices:

1. Shall meet the applicable requirements of Section A listed above for audibility.
2. Shall meet the requirements of Section A listed above for visibility.
3. Provide flush or semi-flush mounted audio/visual units.

C. Addressable Devices - General

1. Addressable devices shall provide an address-setting means using rotary decimal switches or a programmer provided by the fire alarm control panel manufacturer.
2. Detectors shall be Intelligent and Addressable, and shall connect with two wires to the fire alarm control panel Signaling Line Circuits. Thermal detectors shall be of the Fixed Temperature type. Rate of Rise is NOT acceptable.
3. Addressable smoke and thermal detectors shall provide dual (2) alarm and power LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs shall be optional through the system field program. An output connection shall also be provided in the base to connect an external remote alarm LED.
4. Smoke detector sensitivity shall be set through the Fire Alarm Control Panel and shall be adjustable in the field through the field programming of the system. Sensitivity may be automatically adjusted by the panel on a time-of-day basis.
5. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
6. The detectors shall be ceiling or wall mountable and shall include a separate twist-lock base which includes a tamper proof feature. An optional base shall be available with a built-in sounder rated at 85 dBA minimum.
7. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
8. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).

D. Addressable Pull Box (manual station)

1. Addressable Pull Boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch. They shall use a key

operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.

2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
3. Manual Stations shall be constructed of Lexan or metal with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.
4. Stations shall be suitable for surface mounting or semi-flush mounting as shown on the plans, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor.
5. Addressable pull station shall be by Siemens, or approved equal.

E. Intelligent Ionization Smoke Detector

1. The detectors shall use the dual-chamber ionization principal to measure products of combustion and shall, on command from the control panel, send data to the panel representing the analog level of products of combustion.
2. Intelligent photoelectric smoke detector shall be by Siemens, or approved equal.
3. Thermal Detectors shall be intelligent addressable devices rated at 1350°F (580°C) and shall be a programmable fixed temperature rated at 135°F. It shall connect via two wires to the Fire Alarm Control Panel Signaling Line Circuit. Up to 99 intelligent heat detectors may connect to one SLC loop.
4. The detectors shall use an electronic sensor to measure thermal conditions caused by a fire and shall, on command from the control panel, send data to the panel representing the analog level of such thermal measurements.
5. Intelligent photoelectric smoke detector shall be by Siemens, or approved equal.

F. Carbon Monoxide Detector

1. The carbon monoxide detectors shall be manufactured by Ultraguard or System Sensor and shall, on command from the control panel, send data to the panel representing the multiple levels of carbon monoxide based on time weighted averages of the gas present.
2. Carbon Monoxide detectors shall be installed in the basement and one on each sleeping floor, as close to the sleeping rooms as possible. Device location to be verified by Owner.

G. Addressable Dry Contact Monitor Module

1. Addressable Monitor Modules shall be provided to connect one supervised IDC zone of conventional Alarm Initiating Devices (any N.O. dry contact device) to one of the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loops.
2. The Monitor Module shall mount in a 4-inch square, 2-1/8" deep electrical box.

3. The IDC zone may be wired for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the Monitor Module is operational and in regular communication with the control panel.
4. For difficult to reach areas, the Monitor Module shall be available in a miniature package and shall be no larger than 2-3/4" x 1-1/4" x 1/2". This version need not include Style D or an LED.

H. Two Wire Detector Monitor Module

1. Addressable Monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).
2. The Two-Wire Monitor Module shall mount in a 4" square, 2-1/8" deep electrical box or with an optional surface backbox.
3. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal conditions, indicating that the Monitor module is operational and in regular communication with the control panel.

I. Addressable Control Module

1. Addressable Control Modules shall be provided to supervise and control the operation of one conventional Notification Appliance Circuit (NAC) of compatible, 24 VDC powered, polarized Audio/Visual Notification Appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contract relay.
2. The Control Module shall mount in a standard 4-inch square, 2-1/8" deep electrical box, or to a surface mounted backbox.
3. The control module NAC circuit may be wired for Style Z or Style Y (Class A/B) with up to 1 Amp of inductive A/V signal, or 2 Amps of resistive A/V signal operation, or as a dry contact (Form C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
4. The Control Module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the control panel shall use to identify the type of device. An LED shall be provided that shall flash under normal conditions, indicating that the control module is operational and is in regular communication with the control panel.
5. A magnetic test switch shall be provided to test the module without opening or shorting its NAC wiring.
6. The control module shall be suitable for pilot duty applications and rated for a minimum of .6 amps at 30 VDC.

J. Isolator Module

1. Isolator Modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The Isolator Module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop. At least one isolator module shall be provided for each floor or protected zone of the building.
2. If a wire-to-wire short occurs, the Isolator Module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the Isolator Module shall automatically reconnect the isolated section.
3. The Isolator Module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an Isolator Module after its normal operation.
4. The Isolator Module shall mount in a standard 4-inch deep electrical box or in a surface mounted backbox. It shall provide a single LED that shall flash to indicate that the Isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

1.14 BATTERIES AND EXTERNAL CHARGER

A. Battery

1. Shall be 12 volt, Gell-Cell type.
2. Battery shall have sufficient capacity to power the fire alarm system for not less than four twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.
3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

B. External Battery Charger:

1. Shall be completely automatic, with constant potential charger maintaining battery fully charges under all service conditions. Charger shall operate from a 120volt, 60hz power source.
2. Shall be fully rated for fully charging a completely discharged battery within 48 hours while simultaneously supplying any loads connected to the batteries.
3. Shall have protection to prevent discharge through charger.
4. Shall have protection for overloads and short circuits on both AC and DC sides.

PART 2 EXECUTION

2.1 INSTALLATION

- A. Installation shall be in accordance with the NEC, NFPA 72, local and state and codes and ordinances, as shown on the drawings, and as recommended by the equipment manufacturer.

- B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

2.2 BOXES, ENCLOSURES AND WIRING DEVICES

- A. Boxes shall be installed plumb, level and secured firmly in position.

2.3 CONDUCTORS

- A. Each conductor shall be identified as shown on the drawings at each end with wire markers at terminal points. Attach permanent wire markers within 2 inches of the wire termination. Marker legends shall be visible.
- B. Permanently label or mark each conductor at both ends with permanent alphanumeric wire markers.
- C. Use a consistent color code for fire alarm system conductors throughout the installation.

2.4 ACCEPTANCE TESTING

- A. System on and off-site reporting functions shall be demonstrated as follows:
 - 1. Correct zone transmitted for each alarm input
 - 2. Trouble signals received for disconnection of devices
- B. Secondary power capabilities shall be demonstrated as follows:
 - 1. System primary power shall be disconnected for a period of time as specified herein. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period as specified.
 - 2. System primary power shall be restored for forty-eight hours and system-charging current shall be normal trickle charge for a fully charged battery bank.
 - 3. System battery voltages and charging currents shall be checked at the fire alarm control panel.

2.5 DOCUMENTATION

- A. System documentation shall be furnished to the owner and shall include but not be limited to the following: (2) Operation & Maintenance Manuals containing a copy of the custom software program, catalog cut sheets of the devices supplied and an "as-built" drawing.
 - 1. System operation, installation and maintenance manuals.

2. System matrix showing interaction of all input signals with output commands.
3. Documentation of system voltage, current and resistance readings taken during the installation, testing and ATP phases of the system installation.
4. System program showing system functions, controls and labeling of equipment and devices.

2.6 TYPICAL OPERATION

- A. Actuation of any manual pull station, smoke detector, heat detector or water flow switch shall cause the following operations to occur unless otherwise specified:
 1. Activate all programmed notification circuits until silenced.
 2. Actuate all strobe units until the panel is reset.
 3. Annunciate the active initiating devices and zones.
 4. Release all magnetic door holders to doors
 5. Activation of any carbon monoxide detectors, sprinkler system low pressure switch, or valve tamper switch shall cause a system supervisory alarm indication.

2.7 TEST

- A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.
- B. Systems acceptance test shall be coordinated with the Owner and City of Middletown fire marshal. A test of 100% of devices is required. Test smoke shall be used to test smoke detectors and a heating appliance is required to test addressable heat detectors.
- C. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
- D. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
- E. Verify activation of all flow switches.
- F. Open initiating device circuits and verify that the trouble signal actuates.
- G. Open signaling line circuits and verify that the trouble signal actuates.
- H. Open and short notification appliance circuits and verify that trouble signal actuates.
- I. Ground initiating device circuits and verify response of trouble signals.
- J. Ground signaling line circuits and verify response of trouble signals.
- K. Ground notification appliance circuits and verify response of trouble signals.

- L. Check presence and audibility of tone at all alarm notification devices.
- M. Check installation, supervision, and operation of all intelligent smoke detectors during a walk test.
- N. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
- O. When the system is equipped with optional features, the manufacturers' manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.

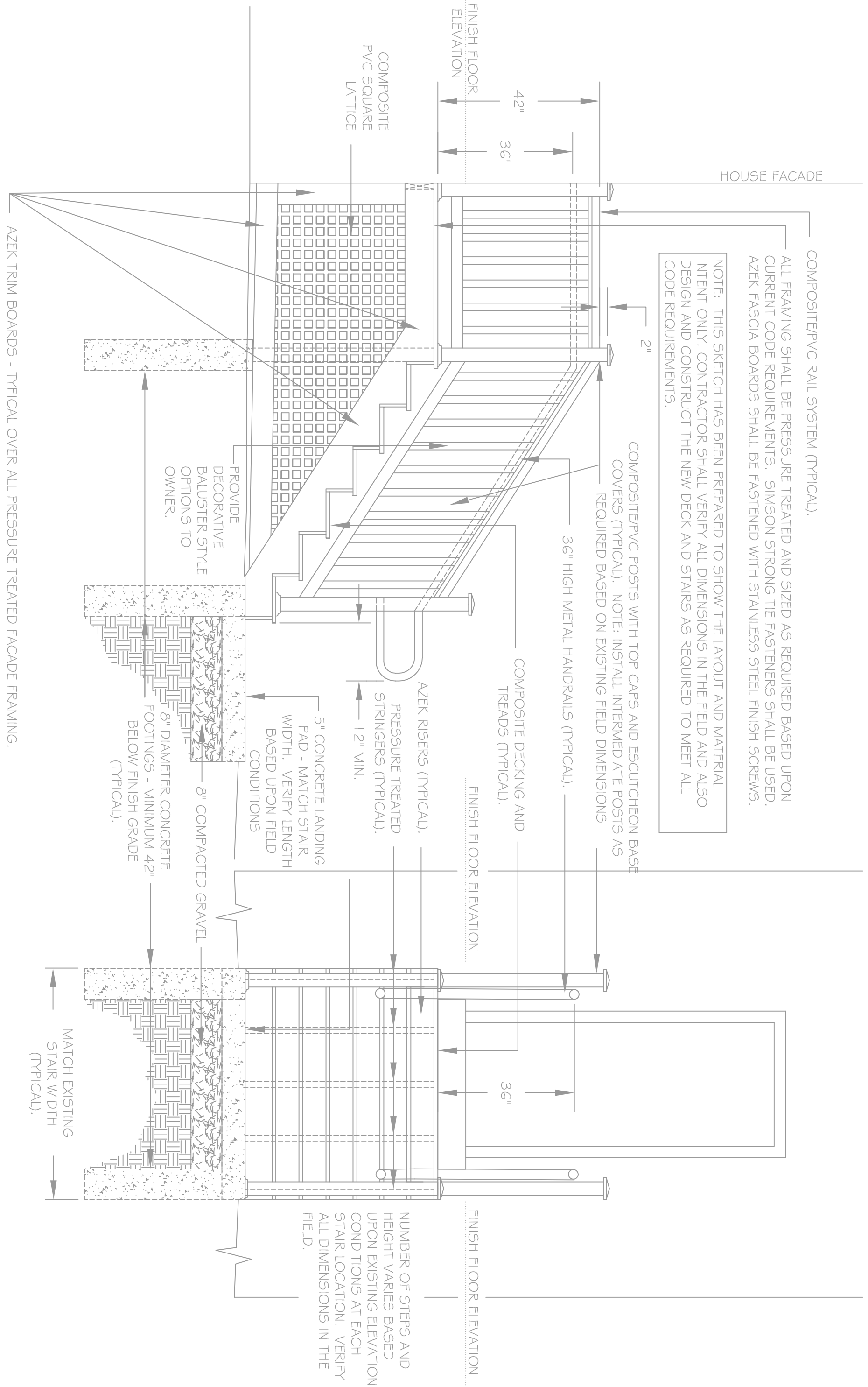
2.8 FINAL INSPECTION

- A. At the final inspection a factory trained representative of the manufacturer of the equipment shall demonstrate that the system functions properly in every respect.

2.9 INSTRUCTION

- A. Provide instruction as required for operating the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.
- B. The contractor and/or the system manufacturers' representatives shall provide a typewritten "sequence of operation" to the owner.

END OF SECTION 16722



MAJOR MAINTENANCE FY 14

TYPICAL LANDING, STAIR & PORCH REPLACEMENT DETAILS

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Scale: 1/4" = 1'-0"
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Revisions:

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