Bid Requirements and Specifications for

Erie Canal Park and Preserve
Barn Reconstruction

NYS Contract No: C1000546

Department of Public Works

Town of Pittsford

Monroe County

New York

Dated: January 16, 2020

BID OPENING: February 25, 2020 at 11:00am at Pittsford Town Hall

This document was prepared with funding provided by the New York State Department of State under Title 11 of the Environmental Protection Fund.

PROJECT SUMMARY

Project Title Erie Canal Park and Preserve Barn Reconstruction
NYS Contract ID C1000546

PROJECT DESCRIPTION
The project consists of the reconstruction of a salvaged historic barn as part of the Erie Canal Park and Preserve Project. The project scope includes site grading, entry pavements and associated cheek walls, foundation installation, and barn reconstruction.

PROJECT OWNER

Town of Pittsford
Paul Schenkel
Commissioner of Public Works
11 South Main Street
Pittsford, NY 14534
(585) 248-6250

PROJECT DESIGN

Landscape Architecture
Sue Steele Landscape Architecture, PLLC
9 Summit Street
Fairport, NY 14450
(585)747-9996
steele.la

Contact: Sue R. Steele, RLA, Owner

Architecture
Design Works Architecture, PC
The Box Factory
6 North Main Street, Suite 104
(585) 377-9001
Fairport, NY 14450
newdesignworks.com

Contact: Chuck Smith, RA, Owner

Environmental
RAVI Engineering & Land Surveying PC
2110 South Clinton Avenue #1
Rochester, NY 14618
(585) 223-3660
ravieng.com

Contact: Mike Bogardus, LS, Survey Department Manager
Jim MacKecknie, PG, Environmental Engineer

PROJECT TYPE

This is a LUMP SUM contract and includes bid alternate(s) 1-3.

A lump sum bid shall be submitted for the basic scope of services for each of the following alternates:

ADD ALTERNATE No. 1: Barn Modernization and Insulation
Installation of foundation wall and slab insulation, barn wall insulation system, egress door, guard rail, windows, glass doors at main barn door entry, and wiring for future electrical needs. This alternate also includes the installation of a retaining wall along the north building elevation and associated earthwork to accommodate the required egress for occupants.

ADD ALTERNATE No. 2: Topsoil and Lawn Establishment
Installation 4" topsoil and seeding to establish lawn. If not accepted the site is to be graded for topsoil and seed by others.

ADD ALTERNATE No. 3: Masonry Enhancements at Barn Foundation
Installation of natural stone veneer on the exposed barn foundation and retaining wall associated with ADD Alternate No. 1.

CONTRACT DOCUMENTS

A. NYSDOT Standard Specifications (US Customary Units) Vol 1-4, January 1, 2020 and Addendums
B. Contract Proposal Book for Erie Canal Park and Preserve Barn Reconstruction
C. Contract Proposal Form for Erie Canal Park and Preserve Barn Reconstruction
D. Contact Drawings for Erie Canal Park and Preserve Barn Reconstruction

WORK BY OTHERS

The intent of the 'Work by Others' portion of the Project Summary section is to advise the prospective Bidder of any anticipated work to be done by others for informational and coordination purposes. The information is furnished solely for the convenience of the Contractor, without a warrant expressed or implied as to its accuracy or completeness.

A. Site Preparation: Stabilized construction access route, tree removals, clearing and grubbing, installation of temporary erosion controls and temporary tree protection fencing will be completed by the Town of Pittsford.

TABLE OF CONTENTS

PART 1 GENERAL INFORMATION, INSTRUCTIONS, AND BID REQUIREMENTS

PURPOSE OF BID:

The Town of Pittsford ("Town") intends to secure the services of an experienced and properly equipped contractor ("Contractor") to provide reconstruction of a salvaged historic barn. The contract award will be based on low bid price from a responsible and qualified bidder; submission of required bonds and insurance; and full compliance with these Requirements and Specifications. The Town reserves the right to reject any bid should the Commissioner of Public Works ("Commissioner") determine that it is in the Town's best interest to do so.

GENERAL INFORMATION AND INSTRUCTIONS FOR BIDDERS:

1. All bidders should review carefully the contents of this document. All of the Requirements and Specifications in this document will become part of the agreement to be signed by the Town and the successful bidder.

2. The Contractor shall include all labor, materials, equipment services and transportation to locate the building on the site designated with all other work

3. The building shall be complete and operating and shall include all exterior and interior materials and systems as shown or indicated in contract documents.

4. Work shall be performed as necessary and required for the construction of the building as indicated. The building shall be as dimensioned with all features and quantities as per specification

5. The final pages of this document contain the "Bid Proposal Form" and "Non-Collusive Bidding Certificate". The Bid Sheet needs to be completed and returned to confirm the amount of the bid. All exceptions to the specifications should be carefully noted on the bid sheet. The Non-Collusive Bidding Certificate is a document required by the General Municipal Law of the State of New York and is to be signed and returned with the Bid Sheet.

6. All bids must be sealed and be addressed to the "Commissioner of Public Works" and be marked "Pittsford Erie Canal Park and Preserve Barn Reconstruction Bid".

7. Bids may be mailed or personally delivered to the Commissioner at the Pittsford Town Hall, 11 South Main Street, Pittsford, New York 14534. All bids must be received by the Commissioner by the date and time set for the bid opening noted on the cover sheet of this document.

8. All bids submitted shall remain good for a period of sixty (60) days from the date of bid opening.

9. The Town reserves the right to reject any bid for non-compliance with these Requirements and Specifications and/or to waive informalities.

10. All bids, at the earliest, will be presented to the Town Board at its March 3, 2020 meeting, for consideration. Immediately following an award of bid by the Town Board, the successful bidder will be notified, by letter from the Commissioner. The Commissioner's letter will include an agreement, to be signed by the successful bidder

and returned to the Town, together with the required Insurance Certificates and performance bond. The signed agreement, Insurance Certificates and performance bond must be received, by the Town, within ten (10) days

11. Additional information may be obtained from Paul Schenkel, Commissioner of Public Works at (585) 248-6250. Informal and informational responses will not be binding on the Town. Formal requests for interpretations of these Requirements and Specifications must be made in writing to the Commissioner at least five (5) days before bid opening.

RESPONSIBLE BIDDER QUALIFICATIONS:

The contractor is made aware that some specifications utilized on this project require specialized experience. The contractor is required to submit qualifications along with the bid proposal form. Contractor must provide written certification that it has 5 or more years' experience under the same name. Contractor must provide written references with contact information for at least five completed timber frame structures. This material will be utilized in evaluating the lowest responsible bidder. The following specifications require contractor qualifications.

A. Timber Frame Construction
B. Structural Insulated Panels (SIP)

The Town reserves the right to reject any bid where the bidder cannot satisfy the Town as to ability to perform.

All workmen shall be skilled and qualified for the work that they perform. All materials used, unless otherwise specified, shall be new and of the types and grades specified. The contractor shall certify that no asbestos containing building materials that exceed Federal mandated safe asbestos levels have been used in the construction of the membrane-covered structure

EXECUTION OF AGREEMENT:

Within ten (10) days after written notice has been given to the successful bidder (hereafter "Contractor") that the agreement has been awarded, the Contractor shall execute an agreement incorporating all of the terms, conditions of these "Bid Requirements and Specifications" and the "Bid Sheet" submitted by the Contractor, together with any and all required performance bond and insurance certificates. In the event that the Contractor shall fail to complete the above, the Contractor's bid will be deemed withdrawn and the bid security forfeited to the Town.

PERFORMANCE BOND:

At the time of agreement execution, the Contractor shall furnish a performance bond in the amount of $15,000.00, in a form and by a company acceptable to the Commissioner, to secure the full, faithful, and timely performance of the terms, conditions and specifications of the agreement.

SAFETY, INDEMNITY AND INSURANCE:

The Contractor shall render performance in a manner such that all persons and property are protected at all times. The Town specifically reserves the right to suspend or terminate (at the Town's option) all performance under this agreement in the event that the Contractor and/or the Contractor's employees or subcontractors are proceeding in a manner that threatens the life, health or safety of any of Contractor's employees, subcontractor's employees, Town employees or members of the public. This reservation of rights by the Town in no way obligates the Town to inspect the safety practices of the Contractor.

The Contractor shall protect, indemnify and hold harmless, including payment for all attorney's fees and court costs, the Town, its officers, agents, and/or employees, from any liability, cost, loss or damage on account of any injury to person or property or both, arising from the Contractor's performance. The Contractor shall defend, at the Contractor's own expense, all suits which may be brought to recover damages arising from the Contractor's performance, including any and all suits or actions brought against the Town, its officers, agents, and/or employees.

At all times during the life of the agreement, the Contractor shall procure and maintain insurance, at the Contractor's expense, for liability for damages, costs and/or claims with insurance companies authorized to do business in New York State, such policies to embrace all operations performed under the Agreement by the Contractor. More particularly, the Contractor shall procure and maintain the kind and amounts of insurance as follows:

1. WORKERS' COMPENSATION INSURANCE: As required by New York State law.

2. MOTOR VEHICLE LIABILITY INSURANCE: Each policy shall cover the Contractor and the Town of Pittsford, as "additional insured", with a combined single limit of not less that $1,000,000.00.

3. COMPREHENSIVE GENERAL LIABILITY POLICY: Each policy shall cover the Contractor and the Town of Pittsford, as "additional insured", with limits not less than $1,000,000.00 for each occurrence; $1,000,000.00 personal injury; and $2,000,000.00, general aggregate.

4. UMBRELLA POLICY: Each policy shall cover the Contractor and the Town of Pittsford, as "additional insured", with coverage of at least $1,000,000.00

At the time of the execution of the agreement, the Contractor shall furnish to the Commissioner "Certificates of Insurance", in a form satisfactory to the Commissioner, showing proof of the above insurance requirements, which Certificates shall provide that the policies shall not be changed or canceled until ten (10) days written notice has been given to the Commissioner.

OTHER LAWS:

The Contractor, and all employees acting under the direction of the Contractor, shall strictly comply with all federal, state and local laws and ordinances controlling or limiting in any way the actions of those engaged in the work (including their wages, hours, or benefits), shall be strictly complied with by the Contractor and all employees working under his direction. This shall also include Equal Employment Opportunity requirements, Article 8, and Section 220 of the New

York State Labor Law. This is a New York State Department of Labor prevailing wage rate bid. Certified payrolls shall be furnished by the Contractor to demonstrate compliance on a monthly basis, prior to payment.

Contractor shall certify that all of its employees doing business with the Town have had all of the sexual harassment prevention training required by NYS Labor Law §201-g within the last year.

PERFORMANCE PENALTIES:

The agreement between the Contractor and the Town may be terminated for the material breach of any term by the Contractor. Further, the Contractor shall be liable for all loss, costs, and/or damages of the Town, including reasonable attorney's fees resulting from any litigation arising hereunder, together with a performance penalty equal to 15% of the bid price, per day, in the event of a breach of contract by the Contractor.

END OF SECTION

PART 2 SCOPE OF SERVICES

LOCATION:

The Barn is to be located on the Town owned property located in the Village of Pittsford along the Erie Canal. The property is accessible from Monroe Avenue.

TIME OF PERFORMANCE

The structure shall be completed and ready for use no later than June 30, 2020. The timing of the start of construction shall be at the discretion of the Contractor, with the approval of the Commissioner. All preliminary site work will be performed by the Town, prior to the commencement of construction by the Contractor.

APPROVAL OF PLANS:

All work to be performed under the conditions of this specification shall comply with the rules and regulations of all agencies having jurisdiction for this classification of construction and design and shall conform to the applicable live loads due to wind, rain and snow. Referenced standards below will be a part of this specification.

SPECIAL CONDITIONS

- Work times under this contract shall be limited to:

  Mondays – Fridays from 7:00 am – 8:00 PM
  Saturdays – Sundays from 9:00 am – 5:00 PM.

- Construction activities must not interfere with the operations and public use of the adjacent Erie Canalway Trail.

SUBMITTAL REQUIREMENTS – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

The requirements of this Section are general in nature and basically apply to all Sections of Part 4: Technical Specifications. Additional submissions and more specific requirements on submissions are contained in the various Specification Sections.

No construction shall be initiated by the Contractor on any portion of the project without the proper submissions called for in the Contract Documents. Before construction is started on any portion of the work, all shop and/or placing drawings pertaining to that portion of the work shall have been submitted and reviewed by the Engineer/Architect.

Schedule - Within ten days after the final work progress schedule has been distributed each Prime Contractor shall submit to the Engineer/Architect a preliminary schedule of Shop Drawing submissions. The Engineer/Architect shall be notified immediately of changes in the preliminary schedule.

Shop Drawings - include all drawings, diagrams, illustrations, brochures, catalog cut sheets, schedules, and other data which are prepared by the Contractor, Subcontractor, manufacturer, supplier, or distributor and which illustrate the equipment or some portion of the work.

Outline of Submittals - This schedule is included for convenience only, and is not necessarily intended to be "all-inclusive". Shop drawings shall be ordered as deemed necessary by the Architect for those items required by the contract specifications.

NUMBER	NAME / DESCRIPTION	SUBMITTALS REQUIRED
	Layout of Work	
	Barn Location	Field Verification
	Site Walls	Field Verification
033000	**Cast In Place concrete**	
	Steel Reinforcement	Product Data
	Design Mixture	Product Data, Material Certificates
	Construction Joint Layout	Field Verification
	Testing Agency	Qualifications
	Concrete Aggregate	Test Report
	Concrete Installer	Qualifications
	Ready-Mix Concrete	Qualifications
312000	**Earth Moving**	
	Geotextile Product Data	Product Data, Sample
	Aggregate Material	Product Data, Test Report, Sieve Analysis, Sample
321313	**Concrete Paving**	
	Form Release Agent Product Data	Product Data
	Steel Reinforcement Product Data	Product Data, Materials Certificates
	Concrete Mix	Product Data, Design Mix, Material Certificates
	Ready Mix Qualifications	Qualifications
	Admixtures, Curing Compounds, Joint Filler Materials Certificates	Materials Certificates
	Concrete Aggregates	Sample, Test Reports
	Integral Colored Concrete with Exposed Aggregate Finish	Mock Up
	Concrete Joint Material	Product Data
	Integral Color Admixture	Product Data
329115	**Soil Preparation**	
	Topsoil	Product Data, Test Report, Sample
329200	**Turf Grasses and Seeding**	
	Seed Mix	Certification and Mix Design
042113	**Stone Masonry**	
	Thin Veneer Stone	Product Data, Sample, Mock Up
	Fieldstone Cap	Product Data, Sample, Mock Up
	Mortar	Product Data, Color Options, Sample

05 31 00	**Steel Deck**	
	Composite Floor Deck	Product Data, Shop Drawings, Product Certificates, Welding Certificates, Research/Evaluation Reports
	Mechanical Fasteners	Test Reports
06 12 00	**Structural Insulated Panels**	
	Structural Insulated Panel	Contractor/Installer Qualifications, Product Data, Calculations, Shop Drawings, Quality Assurances Submittals, Fire Resistant Assemblies, Warranty
06 13 00	**Timber Frame**	
	All Materials	Product Data
	Timber Frame	Contractor/Installer Qualifications, Engineering Shop Drawings
	Cable Reinforcing	Sample
06 16 00	**Hemlock Lumber**	
	Decking	Sample
	Siding	Sample
07 31 13	**Asphalt Fiberglass Roofing**	
	Shingles	Product Data
	Moisture Shedding Underlayment	Product Data
	Metal Flashing	Product Data
	Roofing System	Manufacturer's Installation Instructions, Certificate of Compliance
08 14 23	**Commercial Clad Wood Doors**	
	Doors	Shop Drawings
08 54 73	**Aluminum Wood Composite Windows**	
	Windows	Shop Drawings
08 30 00	**Barn Doors & Hardware**	
	Doors	Sample, Shop Drawings
	Hardware	Product Data

END OF SECTION

BIDDER QUALIFICATIONS & REFERENCES FORM

Please detail the specifics of similar experience to that of this proposed contract that you have successfully completed over the past five years:

Item Description (Circle) Timber Frame Construction Structural Insulated Panels

Contractor/Subcontractor Name _____
Supervisor Name _____
Years of Firm Experience _____
Years of Supervisor Experience _____

Attached firm and supervisor resumes.

REFERENCE PROJECTS

Project No. 1 Project Name / Year Complete _____

Contact Name / Phone Number _____

Project No. 2 Project Name / Year Complete _____

Contact Name / Phone Number _____

Project No. 3 Project Name / Year Complete _____

Contact Name / Phone Number _____

Project No. 4 Project Name / Year Complete _____

Contact Name / Phone Number _____

Project No. 5 Project Name / Year Complete _____

Contact Name / Phone Number _____

Attached reference photograph(s) for each project listed.

Authorized Signature: _____ Date: _____

BID PROPOSAL FORM

Notice: Any deviations from the listed specifications must be completely outlined on the reverse side of this sheet. Failure to comply will constitute reason to declare the bid informal. The Town Board of the Town of Pittsford reserves the right to reject any and all bids and waive any informalities. A Non-Collusive Bidding Certificate must accompany all bids. The prices bid are in full consideration for all work as described in these specifications. If requested by the Town, the bidder shall provide a breakdown of individual costs to assist with bid evaluations.

ALL BIDS MUST BE LISTED AS FOLLOWS ON THIS SHEET:

BASE BID SCHEDEULE			
Item No	Description	Price	
		Written	Figure
1	Excavation, grading, drainage, and subgrade preparation for barn foundation.		
2	Pavement and walls at barn entry.		
2	Barn foundation.		
3	Timber Frame Barn Reconstruction		
BASE BID (Total must equal the sum of the items listed above)			

Additional Alternate No 1: Barn Modernization and Insulation

BID _____ + $_____
(Words) (Figure)

Additional Alternate No. 2: Topsoil and Lawn Establishment

BID _____ + $_____
(Words) (Figure)

Additional Alternate No. 3: Masonry Enhancements at Barn Foundation

BID _____ + $_____
(Words) (Figure)

Signed: _____ Title: _____

Representing: _____

Telephone: _____ Date: _____

NON – COLLUSIVE BIDDING CERTIFICATE

Erie Canal Park and Preserve Barn Reconstruction

As required by §103-d of the General Municipal Law of the State of New York, the bidder certifies that by submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty or perjury, that to the best of knowledge and belief:

1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

_____

Print Name of Bidder

_____

Authorized Signature

_____

Date

NOTE: Where a bid on behalf of a corporation contains this certification, it shall be deemed to have been authorized by the Board of Directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certification as to non-collusion as the act and deed of the corporation.

PART 4: TECHNICAL SPECIFICATIONS

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.

B. Related Sections:

1. Section 321313 "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Owner’s Representative.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.

B. Material Certificates: For each of the following, current and signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Curing compounds.
6. Concrete Sealers
7. Bonding agents.
8. Adhesives.
9. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement**.**

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

B. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Location: Barn first floor slab. Not basement.

2.2 STEEL REINFORCEMENT

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

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I . Supplement with the following:

a. Fly Ash: ASTM C 618, Class F or C.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33, graded.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Lightweight Aggregate: ASTM C 330, 1-inch nominal maximum aggregate size.

E. Water: ASTM C 94/C 94M and potable.

2.4 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E1745, Class 1, with a perm rating of 0.1. Include manufacturer's recommended adhesive or pressure-sensitive tape.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Fortifiber Building Systems Group.
    b. Grace Construction Products; W.R. Grace & Co. -- Conn.
    c. Insulation Solutions, Inc.
    d. Poly-America, L.P.
    e. Raven Industries, Inc.
    f. Reef Industries, Inc.
    g. Stego Industries, LLC.
    h. W.R. Meadows, Inc.

2.6 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
1. Basis-of-Design Product: Subject to compliance with requirements, provide BASF Corporation; MasterKure HB 200WB (Pre-2014: Kure-N-Harden) or a comparable product.

2.7 CURING MATERIALS

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

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. BASF Construction Chemicals - Building Systems; Kure 200.
c. ChemMasters; Safe-Cure Clear.
d. Conspec by Dayton Superior; W.B. Resin Cure.
e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
f. Edoco by Dayton Superior; Res X Cure WB.
g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
h. Kaufman Products, Inc.; Thinfilm 420.
i. Lambert Corporation; AQUA KURE - CLEAR.
j. L&M Construction Chemicals, Inc.; L&M Cure R.
k. Meadows, W. R., Inc.; 1100-CLEAR.
l. Nox-Crete Products Group; Resin Cure E.
m. Right Pointe; Clear Water Resin.
n. SpecChem, LLC; Spec Rez Clear.
o. Symons by Dayton Superior; Resi-Chem Clear.
p. TK Products, Division of Sierra Corporation; TK-2519 DC WB.
q. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

2.8 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

D. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches plus or minus 1 inch (25 mm).
4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery.

2.9 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Normal-weight concrete.
1. Minimum Compressive Strength: 3500 psi at 28 days.

B. Foundation Walls: Normal-weight concrete.
1. Minimum Compressive Strength: 3500 psi at 28 days.

C. Slabs-on-Ground: Normal-weight concrete.
1. Minimum Compressive Strength: 4,000 psi at 28 days.

D. Suspended Slabs: Normal-weight concrete.
1. Minimum Compressive Strength: 4,000 psi at 28 days.

2.10 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

2.12 EPOXY ADHESIVE

A. Acrylic Resin Epoxy Adhesive: Shall be Redhead Epcon A7 or approved equal.
1. Shall meet ASTM C881-02 (Type IV, Grade 3, Class A, B, C)
2. Shrinkage during cure shall meet ASTM D2566: .002 / in.
3. Heat deflection temperature, ASTM D648: 140 deg min.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Chamfer exterior corners and edges of permanently exposed concrete.

D. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

E. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

F. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."

2. Contractor to acquire anchor templates from appropriate design source for all embedded anchoring.

3.3 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
1. Lap joints 6 inches and seal with manufacturer's recommended tape.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.

C. Contraction Joints in Slabs-on-Ground: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least **one-fourth** of concrete thickness as follows:
   1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
   1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
   2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
   3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Owner’s Representative.

C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of

weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

D. Cold-Weather Placement: Comply with ACI 306.1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

E. Hot-Weather Placement: Comply with ACI 301:

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply only to concrete surfaces that are not visible.

B. Smooth-Rubbed Finish:

1. Apply to exposed visible surfaces of all cast in place concrete.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to first floor of barn only.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.

1. Apply a trowel finish to first floor of barn.
2. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-foot long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.

3.9 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Cure concrete for 7 days according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.10 LIQUID FLOOR TREATMENT APPLICATION

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
   2. Do not apply to concrete that is less than [**three**] [**seven**] [**14**] [**28**] days' old.
   3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas if acceptable to, and approved by, Owner’s Representative. Remove and replace concrete that cannot be repaired and patched to Owner’s Representative’s approval.

B. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

C. Repair materials and installation not specified above may be used, subject to approval by Owner’s Representative.

3.12 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

C. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
   1. Testing Frequency: At least Obtain at least one composite sample for each 100 cu. yd., or less, of each concrete mixture placed each day.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
    a. Specimens shall be cured under laboratory conditions except that when in the opinion of the Architect there is possibility of the surrounding air temperature falling below 40ºF.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

D. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

F. If average strength of seven day tests fail to satisfy the Architect, work affected by concrete poured shall be stopped until tests can be confirmed by 28 day tests. Where Architect is not satisfied as to strength or durability of completed concrete, the Architect may require: (1) additional tests, or (2) removal and reconstruction of entire section or structure. Costs of any additional tests, removal, and reconstruction resulting from the failure to meet the specified compression strength with the test cylinders shall be the responsibility of the Contractor.

G. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

H. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

I. Concrete paving will be considered defective if it does not pass tests and inspections.

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

K. Prepare test and inspection reports.

3.13 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments Installer.

END OF SECTION 033000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preparing subgrades for walks, pavements, and turf and grasses.
2. Excavating and backfilling for buildings and structures.
3. Subbase course for concrete pavements..

B. Related Sections:
1. Section 033000 "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
2. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
3. Section 329200 "Turf, Grasses, and Seeding" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and surface paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Owner’s Representative. Unauthorized excavation, as well as remedial work directed by Owner’s Representative, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency according to ASTM D 1586.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course or surface pavement course.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geosynthetics / geotextile fabrics.

B. Samples for Verification: For the following products, in sizes indicated below:
1. Geotextile fabrics: 12 x 12 inches, for all specified fabrics
2. Base/subbase course aggregates and soil materials: 1 Gallon sample of each proposed material.

1.5 INFORMATIONAL SUBMITTALS:

A. Qualification Data: For qualified testing agency.

B. Materials test reports: For each on-site and borrow soil materials proposed for fill and backfill as follows:
1. Classification according to ASTM D 2487
2. Laboratory compaction curve according to ASTM D 698 ASTM D 1557.

C. Pre-Excavation Existing Damage Photographs: Show existing conditions of protected features, adjoining construction or other site features that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.6 QUALITY ASSURANCE:

A. Geotechnical testing agency qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining trails, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct trails, 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 Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Owner’s Representative.

C. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

D. Do not commence earth moving operations until all temporary erosion- and sedimentation-control measures are in place.

E. Do not commence earth moving operations until all plant/vegetation protection measures are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory (Suitable) Soils: Satisfactory soil material is defined as any material whose composition is satisfactory for use in embankment construction as per NYSDOT Standard Specifications, Subsection 203-1. In general, any mineral (inorganic) soil, blasted or broken

rock and similar material of natural or man-made origin, including mixtures thereof, are considered as satisfactory materials. The Owner's Representative will determine whether a specific soil material is a satisfactory soil material.

C. Unsatisfactory (Unsuitable) Soils: Unsatisfactory soil material is defined as any material containing vegetative or organic matter, such as muck, peat, organic silt, topsoil, or sod that is not satisfactory for use in embankment construction as per NYSDOT Standard Specifications, Subsection 203-1. Certain man-made deposits of industrial waste, sludge, or landfill may also be determined by the Owner's Representative to be unsatisfactory.

D. Sand and gravel, approved blast furnace slag, or stone, conforming to the material requirements of NYSDOT Standard Specifications, Subsection 304-2. Provide the type of subbase material shown on the Contract Drawings or called for in other Specification Sections for each application.

Type	**Sieve Size Designation**	**Percent Passing By Weight**
1	3 inch	100
	2 inch	90-100
	1/4 inch	30-65
	no. 40	5-40
	no. 200	0-10
2*	2 inch	100
	1/4 inch	25-60
	no. 40	5-40
	no. 200	0-10
3	4 inch	100
	1/4 inch	30-75
	no. 40	5-40
	no. 200	0-10
4	2 inch	100
	1/4 inch	35-60
	no. 40	5-40
	no. 200	0-10

*note: Type 2 subbase material must consist solely of approved stone which is the product of crushing ledge rock.

E. Base Material: No. 1 crusher run (CR1) dolomitic limestone. The Owner's Representative must approve the source of all base materials.

F. Fill Materials: Satisfactory soil materials with no particles larger than 2/3 of the maximum allowable loose lift thickness. (See compaction requirements for allowable loose lift thicknesses.)

G. Backfill Materials: In cases where backfill with subbase material, drainage fill, select granular backfill or another specific fill material is not specified, backfill may be with satisfactory soil materials, with no particles larger than 2" allowed in trench backfills up to the subgrade and with no particles larger than 4" in all other unspecified backfills up to the subgrade line.

H. Select Granular Backfill: Sand and gravel or stone meeting the following requirements:

Sieve Size	Percent Passing by Weight
3 inch	100
2inch	90-100
¼ inch	30-65
No 40	5-40
No 200	200 0-8

I. Spoil: Satisfactory or unsatisfactory soil materials not suitable or required for filling or backfilling, finish grading, or landscaping.

J. Stone Bedding: Crushed stone conforming to the material requirements of NYSDOT Standard Specifications, Subsection 703-02. Material furnished shall be size designation 1 in accordance with NYSDOT Subsection 703-02, Table 703-4.

Size Designation	Sieve Size	Percent Passing By Weight
1	1 inch	100
	1/2 inch	90-100
	1/4 inch	0-15

K. Sand Bedding Material: Clean, hard, durable sand with uncoated particles, free from lumps of clay and all deleterious substances, meeting the requirements of NYSDOT Standard Specifications, Subsection 703-06, Cushion Sand.

L. Drainage Fill, Backfill, and Drainage Pipe Bedding Material: Clean, washed, gravel, crushed gravel, or crushed stone meeting the material requirements of NYSDOT Subsection 703-02. Material furnished shall be size designation 1 in accordance with NYSDOT Subsection 703-02, Table 703-4. Gradation shall be the same as noted for stone bedding.

M. Underdrain Filter Material: Washed, graded, no. 1 crushed or screened gravel conforming to N.Y.S.D.O.T. subsection 703-02, size designation 1 per table 703-4.

N. Trench Stabilization Material: Crushed stone meeting the requirements of NYSDOT Standard Specifications, Subsection 703-02, and size designation 3 in accordance with Table 703-4.

2.2 GEOSYNTHETICS

A. Sub-Surface Drainage Fabric: Non-woven needle-punched geotextile, manufactured for subsurface drainage applications, Mirafi 140N or approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface, is specified in Section 31100 "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Section 31100 "Site Clearing." during earthwork operations.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

3.5 EXCAVATION FOR PAVEMENTS

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

3.6 EXCAVATION FOR UTILITY / DRAINAGE TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.7 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under pavements, pipes, or structures with select structural fill or NYSDOT Type 2 subbase materials, as approved by owner’s representative.

3.8 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use material as specified.
3. Under footings and foundations, use material as specified .

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.10 SOIL MOISTURE CONTROL

A. Prior to compaction, uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 6 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698 ASTM D 1557:

1. Under structural foundations and building slabs, proofroll the existing subgrade prior to starting mass fill operations. Proof roll the subgrade to verify it is stable and verify that unsuitable fill has been removed. Compact the new fill to 95 percent density (ASTM D-1557). Compact subsequent layers of fill to 95 percent within 2 percent of optimum moisture content as determined by ASTM D-1557. Backfill around footings, foundation walls, and column piers with alternating lifts, evenly on all sides. Backfill under slabs, sidewalks, and pavements to 95 percent density within 2 percent of optimum moisture content as determined by ASTM D-1557 and areas in green areas to 90 percent or as specified as the landscape architect. Conduct at least one density test per 50 lineal feet of backfill on alternate lifts but not less than two tests per lift.
2. Under walkways and pavements, scarify and re-compact top 12 inches and compact each layer of backfill or fill soil material at 95 percent as determined by ASTM D-1557.

3. Under lawn or unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent as determined by ASTM D-1557.
4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent as determined by ASTM D-1557. Test alternate layers of fill according to the same compaction standards as in item 3.12 C 1 above.

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1/2 inch .
3. Pavements: Plus or minus 1/2 inch.

3.13 SUBBASE AND BASE COURSES UNDER STONE DUST TRAIL, PAVEMENTS, AND WALKS

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

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Shape subbase course and base course to required crown elevations and cross-slope grades.
3. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

3.14 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material and maximum lift thickness comply with requirements.
3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

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

3.15 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner’s Representative.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Concrete Pavement
   2. Integral Colored Concrete
   3. Exposed Aggregate Finish

B. Related Sections:

   1. Section 033000 "Cast-in-Place Concrete" for general building applications of concrete.

1.3 DEFINITIONS

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

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type of product or exposed finish, a mockup prepared as indicated below:
   1. Integral Colored Concrete with Exposed Aggregate Finish: 4-feet by 4-feet by 3 inch mockup.

C. Other Action Submittals:

   1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Joint fillers.

C. Material Test Reports: For each of the following:

1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

C. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

D. ACI Publications: Comply with ACI 301 unless otherwise indicated.

E. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of full-thickness sections of concrete paving to demonstrate typical joints; surface finish, texture, and color; curing; and standard of workmanship.
2. Build mockups of concrete paving not less 4-feet by 4-feet by 3 inch. and include sawcut joints for approval.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 PROJECT CONDITIONS

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

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

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

B. Joint Dowel Bars: Stainless steel dowel bars. Cut bars true to length with ends square and free of burrs.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, Type I

B. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Exposed Aggregate: Selected, hard, and durable; washed; free of materials with deleterious reactivity to cement or that cause staining; from a single source, with gap-graded coarse aggregate as follows:

1. Aggregate Sizes: 1/2 to 3/4 inch nominal.
2. Aggregate Source, Shape, and Color: # 1 crushed gravel, neutral color range.

D. Water: Potable and complying with ASTM C 94/C 94M.

E. Air-Entraining Admixture: ASTM C 260.

F. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Axim Italcementi Group, Inc.; Caltexol CIMFILM.
b. BASF Construction Chemicals, LLC; Confilm.
c. ChemMasters; Spray-Film.
d. Conspec by Dayton Superior; Aquafilm.
e. Dayton Superior Corporation; Sure Film (J-74).
f. Edoco by Dayton Superior; BurkeFilm.
g. Euclid Chemical Company (The), an RPM company; Eucobar.
h. Or approved equal

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

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Anti-Hydro International, Inc.; A-H Curing Compound #2 DR WB.
b. ChemMasters; Safe-Cure Clear.
c. Conspec by Dayton Superior; [D.O.T. Resin Cure] [DSSCC Clear Resin Cure].
d. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
e. Edoco by Dayton Superior; [DSSCC Clear Resin Cure] [Resin Emulsion Cure V.O.C. (Type I)].
f. Euclid Chemical Company (The), an RPM company; Kurez W VOX.
g. Or approved equal

2.6 RELATED MATERIALS

A. Joint Fillers: Non-extruding, resilient, closed cell, semi-rigid foam preformed recess strips or ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips if approved by owner's representative. Provide extruded PVC cap with a removable top to receive self-leveling join sealant.

B. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

1. Basis-of-Design Product: Subject to compliance with requirements, provide
    1) Top Cast Grade 25
    Dayton Superior Corporation
    www.daytonsuperior.com

    2) Or approved equal.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): Minimum 4000 psi.

2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.44.

3. Slump Limit: 2 inches to 3 inches, plus or minus 1 inch (25 mm).

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 6 percent plus or minus 1.5 percent.

D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use in concrete as required for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.
1. Color: Cool Grey, as selected by Architect from Manufacturers standard range.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M[and ASTM C 1116/C 1116M]. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes;

2. When air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).
2. Correct subbase with soft spots and areas of pumping or rutting according to requirements in Section 312000 "Earth Moving."

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

3.2 PREPARATION

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

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

3.5 JOINTS

A. General: Construct construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete.
   1. Locate all joints as indicated on the Drawings.

B. Construction Joints: Locate as called for on the drawings and at side and end terminations of paving or to coincide with required expansion joint locations.

C. Expansion Joints: Form expansion joints and install preformed joint-filler strips. Locate expansion joints where indicated on the Drawings.
   1. Extend joint fillers full width of joint.
   2. Terminate joint filler below finished surface with polystyrene removable cap.
   3. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
   4. Protect top edge of joint filler during concrete placement with extruded polystyrene removable cap. Remove protective cap after concrete has been placed and finished on both sides of joint to receive joint sealant.

D. Isolation Joints: Locate isolation joints wherever concrete abuts other fixed objects such as curbs, utility structures, light poles, etc.
   1. Form isolation joints the full width of adjacent surfaces and terminate joint materials below finished surface of concrete.
   2. Isolation joints may include thin joint filler strips of less than 1/4-inch in thickness that prevent fresh concrete from adhering to adjacent site objects and features.

E. Install stainless steel dowel bars and sleeve assemblies at all expansion joints.
   1. Dowel and sleeve assemblies shall be spaced per plans and no more than 16” o.c. across full width of each expansion joint.
   2. Dowel and sleeve assemblies are not necessary for isolation joints.

F. Contraction (control) Joints: Form weakened-plane contraction (control) joints, sectioning concrete into areas as indicated on the Drawings. Construct contraction joints for a depth as indicated on the plans and equal to at least one-fourth of the concrete slab thickness, as follows:
   1. Contraction joints to be Sawn, fully straight along joint lines and perpendicular to finished pavement edges or where indicated on drawings.

G. Edging: Tool edges of pavement in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces. Radius to be 1/4 inch.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

K. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
   1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 SPECIAL FINISHES

A. Monolithic Exposed-Aggregate Finish: Expose coarse aggregate in paving surface as follows:

   1. Immediately after float finishing, spray-apply chemical surface retarder to paving according to manufacturer's written instructions.
   2. Cover paving surface with plastic sheeting, sealing laps with tape, and remove when ready to continue finishing operations.
   3. Without dislodging aggregate, remove mortar concealing the aggregate by lightly brushing surface with a stiff, nylon-bristle broom. Do not expose more than one-third of the average diameter of the aggregate and not more than one-half of the diameter of the smallest aggregate.
   4. Fine-spray surface with water and brush. Repeat cycle of water flushing and brushing until cement film is removed from aggregate surfaces to depth required.

3.9 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by a combination of these as follows:

   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

      a. Water.

b. Continuous water-fog spray.
c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm) and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.10 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/4 inch .
2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/4 inch (13 mm).
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches (13 mm per 300 mm) of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch (25 mm).
6. Vertical Alignment of Dowels: 1/4 inch (6 mm).
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches (6 mm per 300 mm) of dowel.
8. Joint Spacing: 3 inches (75 mm).
9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.
10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner to engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: At least Obtain at least one composite sample for each 100 cu. yd., or less, of each concrete mixture placed each day.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when it is 80 deg F (27 deg C) and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
    a. Specimens shall be cured under laboratory conditions except that when in the opinion of the Architect there is possibility of the surrounding air temperature falling below 40ºF.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
    1. If average strength of seven day tests fail to satisfy the Architect, work affected by concrete poured shall be stopped until tests can be confirmed by 28 day tests. Where Architect is not satisfied as to strength or durability of completed concrete, the Architect may require: (1) additional tests, or (2) removal and reconstruction of entire section or structure. Costs of any additional tests, removal, and reconstruction resulting from the failure to meet the specified compression strength with the test cylinders shall be the responsibility of the Contractor.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

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

I. Prepare test and inspection reports.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Owner’s Representative.

B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material.

END OF SECTION 321313

SECTION 329200 – TURF, GRASSES, AND SEEDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Seeding.
2. Hydroseeding.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. NOTE: Use of pesticides is not permitted on this project.

C. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. and drawing designations for planting soils.

D. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 INFORMATIONAL SUBMITTALS

A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture as specified within the seed schedule (see Drawings). Include identification of source and name and telephone number of supplier.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required maintenance periods.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.7 FIELD CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.

1. Spring Planting: April 1 to May 1
2. Fall Planting: August 15 to September 30.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SEED

A. Proprietary seed mixes as follows:

1. Seed Schedule “A”: ERNMIX-113 (“Conservation Mix”)
   a. As provided by Ernst Conservation Seed, 1-800-873-3321.
   b. See drawings seed schedule for application rates.

2. OR Approved Equal

2.2 FERTILIZERS

A. The Contractor shall utilize an all-organic starter fertilizer necessary to produce an acceptable uniform viable turf and/or meadow.

2.3 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable or which is dusty.

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

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Owner’s Representative and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

A. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.

2. Loosen surface soil to a depth of at least 6 inches (150 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.
3. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

D. Before planting, obtain Owner’s Representative’s acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

A. Sow seed with spreader or seeding machine or hydroseed (see below). Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other
1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate sufficient to meet the required performance criteria, but not less than the rate recommended by the grass see supplier.

C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.

D. Use an ‘Inert Carrier’ for wetland seed mic and meadow seed mix to improve coverage and uniformity of distribution.

E. Protect seeded areas with slopes exceeding 1:5 with erosion-control fiber or jute mesh installed and stapled according to manufacturer's written instructions.

F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch.
1. Apply materials at a rate as specified in the seeding schedule (drawings).
    a. Straw mulch - 2-1/2 tons per acre, or two 50 pound bales per 1,000 square feet of area
    b. Liquid tackifier - the rate recommended by the manufacturer

3.5 HYDROSEEDING

A. Hydroseeding: Mix specified seed, all-organic fertilizer (except in wetland areas where NO fertilizer shall be used), and fiber mulch in water, using equipment specifically designed for

hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

B. Mix slurry with fiber-mulch manufacturer's recommended tackifier.

C. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre (5.2-kg/92.9 sq. m) dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre (10.4 kg/92.9 sq. m).

D. Protect seeded areas with slopes exceeding 1:5 with erosion-control fiber or jute mesh installed and stapled according to manufacturer's written instructions.

3.6 TURF MAINTENANCE

A. Contractor is to maintain all seeded areas until they have obtained a continuous blanket of turf that is of a relatively uniform height that is free of undesirable or invasive plants and other undesirable characteristics, and has been accepted by the Owner.

B. Maintenance will include but is not limited to: soil amendment; watering (where access to a natural or municipal source of water is available); de-weeding; mowing; regrading and reapplication of topsoil; and reseeding. Areas of topsoil or seeded areas that become washed out, eroded, rutted, damaged, settled below required grades, or achieve unsatisfactory germination, are to be repaired and re-seeded.

C. Where water is readily available from a natural or municipal source, water is to be applied to adequately maintain surface soil moisture for proper seed germination. After grass seed has germinated, continue to water the seeded area as needed until the initial growth has been accepted by the Owner.

D. Until the initial growth of turf has been accepted by the Owner, turf areas are to be mowed as frequently as necessary to maintain a maximum turf height of 3 inches and to minimize weed growth. No more than 1/3 of the height of the grass blade is to be mowed off during any one mowing operation.

E. After a reasonable period of time has elapsed, if the Owner’s Representative determines that any seeded area has failed to have satisfactorily produced a thriving turf area due to the Contractor’s seeding operations and/or lack of proper maintenance, the Contractor is to repeat all of the work required by this specification to repair such failed area until a satisfactory stand of turf has been established.

3.7 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf or meadow work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200

SECTION 334200 - UNDERDRAIN

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. The work shall consist of constructing underdrain installations in conformity with the lines, grades, and cross sections as required in the Contract Documents and as directed by the Owner's Representative.

1.2 MATERIALS

A. Underdrain filter material shall consist of cleaned, washed crushed stone or pea gravel, meeting the gradation requirements of this specification. Material and gradation tests and quality control methods pertaining to the item requirements and work of this section will be performed as ordered by the Owner's Representative. Underdrain filter material shall be stockpiled and approved by the Owner's Representative prior to installation. Gradation requirements shall meet the following:

Sieve Size	Percent Passing by Weight
1 inch	100%
1/2 inch	30 to 100%
1/4 inch	0 to 30%
#10	0 to 10%
#20	0 to 5%

B. The soundness of material meeting the requirement of NYSDOT Sections 703-02 Coarse Aggregates or 703-10 Lightweight Aggregates, is acceptable for underdrain filter material. When electing to use material from sources not approved under NYSDOT Sections 703-02 Coarse Aggregates or 703-10 Lightweight Aggregates, the soundness of the material shall be tested, and shall not have a loss exceeding 20 percent by weight after four cycles of the Magnesium Sulphate Soundness Test.

C. Underdrain Pipe: Underdrain pipe shall be perforated corrugated polyethylene in conformance with the requirements of AASHTO M252 Plastic and Polyethylene Corrugated Drainage Pipe or Tubing, except as follows:

1. Underdrain shall be black heavy duty corrugated polyethylene.
2. Underdrain shall have slotted or knifed perforations uniformly spaced along the length and circumference. Slots shall be cleanly cut with no extraneous materials or webs remaining in the perforations.
3. Minimum pipe stiffness at 5 percent and 10 percent deflection at 73°F +/- 4°F shall be 35 pounds/inch/inch and 30 pounds/inch/inch, respectively.
4. Screw, split, or snap fittings shall be used.

5. Straight lengths of pipe shall be furnished with a minimum nominal length of 20 feet. Coiled pipe may be substituted for straight pipe, only in those areas where it would be more appropriate and as approved by the Owner's Representative.

D. Drainage fabric shall be a non-woven geotextile fabric specifically designed for drainage applications. Drainage fabric shall be mirafi 140N or an approved equal.

1.3 CONSTRUCTION DETAILS

A. Underdrain Filter Material: After the pipe and drainage fabric installation has been inspected and approved, underdrain filter material shall be loosely placed around and over the pipe to such a depth that, after compaction, underdrain filter material will extend to a level 4 inches above the underdrain pipe. The depths of the underdrain filter material shall be as called for on the drawings, and no lift shall be more than 6 inches thick prior to compaction, and shall be compacted by two passes of a vibrating pad or drum type compactor. All contaminated underdrain filter material shall be replaced. After placement of all underdrain filter material, drainage fabric shall be lapped over the top of the underdrain filter material prior to backfilling with soil.

B. Underdrain Filter Material at Structures: Underdrain filter material shall be placed adjacent to structures as specified on the plans.
1. The lift thickness for the loose material shall not exceed 6 inches and shall precede the placement of each lift of the adjacent backfill material.
2. A physical barrier may be used to facilitate placement of the underdrain filter material and adjacent backfill. This barrier shall not be left in place and shall be removed prior to compaction of the material.
3. Each lift of the filter material and backfill material located within a minimum distance of 3 feet from the back wall plus the footing heel projection shall be compacted simultaneously.
4. Compaction of this material shall be provided by two passes of a vibratory compactor.
5. Placement and compaction operations shall be conducted in a manner so as to insure that the top surface of each lift of filter material shall not be contaminated by the adjacent backfill materials.
6. All contaminated underdrain filter material shall be replaced.

C. Underdrain Pipe: A carefully leveled and compacted bed of underdrain filter material shall be prepared after placement of drainage fabric and just prior to the placement of the underdrain pipe. Filter material bedding shall be approved by the Owner's Representative prior to the placement of any pipe. The subgrade surface will be checked prior to pipe installation to insure that it is pitched toward the pipe. The upgrade end of underdrain pipe runs shall be closed with a suitable plug. The underdrain pipe shall be placed with perforations down.
1. Sections of pipe shall be joined only with approved fittings and the pipe shall not be split to widen it to join sections. If vertical alignment cannot be maintained, lengths of pipe shall be cut and secured with approved couplings.
2. Underdrain pipe connection at the catch basin or manhole shall be thoroughly sealed with concrete and 100 per cent epoxy grout.

1.4 STORAGE AND HANDLING

A. Storage and handling precautions of AASHTO M252 Plastic and Polyethylene Corrugated Drainage Pipe or Tubing are reiterated as follows:
   1. Polyethylene may deteriorate from prolonged exposure to ultraviolet radiation. Deterioration in storage may be evidenced by brittleness, cracking or splitting. For extended storage, pipe shall be kept out of direct sunlight or be covered with an opaque material to shield it from sunlight.
   2. Polyethylene will melt and burn when exposed to flame. Flame damaged portions shall not be used.
   3. Pipe damaged by deterioration, crushing or stretching shall not be used.
   4. Extra care must be used in handling in cold weather. Prior to placement, the pipe shall be stored for at least 24 hours in an area having a minimum temperature of 50°F.

END OF SECTION 334200

SECTION 330500 - COMMON WORK RESULTS FOR UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Sleeves.

1.3 DEFINITIONS

A. Exposed Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.

B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

C. PVC: Polyvinyl chloride plastic.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.5 COORDINATION

A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 SLEEVES

A. PVC Pipe Sleeves: ASTM D 1785, Schedule 40.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on the Coordination Drawings.

B. Install sleeves for pipes passing through concrete and masonry walls and concrete floor slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of equipment areas or other wet areas 2 inches above finished floor level.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.

a. PVC Pipe Sleeves: For pipes smaller than NPS 6.

END OF SECTION 330500

SECTION 042113 - STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Thin Veneer Stone
   2. Fieldstone Cap
   3. Mortar and grout.

B. Related Sections:

   1. Section 033000 "Cast-in-Place Concrete" for masonry backing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type and color of the following:
   1. Veneer Stone as specified (6 or more individual stones showing the full range of colors in specified blend).
   2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.4 INFORMATIONAL SUBMITTALS

A. List of Materials Used in Constructing Mockups: List generic product names, sourse, and include mix proportions for mortar and grout and source of aggregates.

B. Material Certificates: For each type and size of the following:

   1. Masonry units.

      a. Include data on material properties.
      b. For stone veneer, include size-variation data verifying that actual range of sizes falls within specified tolerances.

   2. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
   3. Grout mixes. Include description of type and proportions of ingredients.

C. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Mockups: Install 5 linear feet of veneer stone (at full wall height) to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install veneer stone on concrete wall as shown on Drawings.

2. Approval of mockups is for color, texture, and pattern of masonry units; relationship of mortar colors to masonry unit colors; alignment and tooling of joints; installations of corner pieces, and aesthetic qualities of workmanship.

3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stone masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed. Immediately remove grout, mortar, and soil that come in contact with such masonry.

C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost

or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.2 THIN VENEER STONE

A. General: Provide New York Fieldstone, light and dark grey surface tone color range.

B. Veneer Stone:

1. Products: Subject to compliance with requirements:

a. Yukon Valley Stone
yukonvalley.com

b. Approved equal

2. Size (Actual Dimensions): 4-16” diagonals, 0.75-1.75” thick

2.3 FIELDSTONE CAP

A. General: Provide New York Fieldstone, light and dark grey surface tone color range to match thin veneer.

B. Cap Stone:

1. Products: Subject to compliance with requirements:

a. Yukon Valley Stone
yukonvalley.com

b. Approved equal

2. Size (Actual Dimensions): 10-16” diagonals, 3” thick

2.4 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Mortar Cement: ASTM C 1329.

1. Products: Subject to compliance with requirements, Type “S”.

E. Mortar Color: Color to be selected from the manufacturer’s standard range..

2.5 MASONRY CLEANERS

A. Manufacturer Recommended Cleaner: For all stone cleaning utilize Manufacturer's standard-strength recommended cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.6 MORTAR MIXES

A. General: Do not use admixtures, including air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

B. Pigmented Mortar: Use colored cement product. Do not add pigments to colored cement products.
1. Mix to match sample provided by Owner’s Representative.
2. Application: Use pigmented mortar for exposed mortar joints with the following units:

a. Stone cap mortar joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. Verify that cast in place concrete backing meets dimensional requirements for finished wall before proceeding with unit masonry work.

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

3.2 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

C. Wetting of Veneer: Spray or brush water onto the surface of the stone coat to prevent rapid drying of the mortar

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

3.4 MORTAR BEDDING AND JOINTING

A. Using a mason’s trowel, apply approximately ½” thick layer of mortar to the entire back side of the stone. Then press the stone firmly into place on the prepared wall surface making sure mortar squeezes out around all sides of the stone. Tap or wiggle the stone to ensure a good bond.

B. After the stone has been applied to the wall surface, use a grout bag to fill in the 1/2” wide joints with mortar, making sure to fill all voids.

C. After the mortar joints become firm use a wooden or metal striking tool to rake out the excess mortar to the desired depth.

3.5 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.

B. All finished work must meet approved mockup standards.

3.6 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry using manufacturer recommended cleaner.

3.7 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042113

SECTION 05 31 00 – STEEL DECK

1.0 PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Composite floor deck.

B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for concrete fill and reinforcing steel.

C. Floor deck shall serve as permanent metal form and total positive reinforcement for concrete floor slabs as indicated on the contract drawings.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated provide the manufacturer's specifications, section properties, load tables, diaphragm shear tables, dimensions, finishes, and noise reduction coefficients, fire resistance ratings, and U. L. full scale slab fire test reports shall be submitted.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: Signed by steel deck manufacturers certifying that products furnished comply with requirements.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

E. Product Test Reports: From a qualified testing agency indicating that each of the following complies with requirements, based on comprehensive testing of current products:

1. Mechanical fasteners.

F. Research/Evaluation Reports: Evidence of steel deck's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.4 REFERENCES STANDARDS

A. Section properties shall be computed in accordance with the American Iron and Steel Institute (AISI) Specification for Design of Cold-Formed Steel Structural Members.

B. Welding shall comply with the applicable provisions of the American Welding Society (AWS) D1.3 Structural Welding Code-Sheet Steel.

C. Superimposed Load and Diaphragm Shear Capacities: Shall be computed in accordance with the requirements of the Steel Deck Institute (SDI).

D. Fire resistance classification shall be acceptable for use in Underwriters Laboratories Fire Resistance Design Index. All floor deck panels used in rated fire resistance designs shall bear the appropriate U. L. Classification marking.

E. Cast-in-place concrete shall be in accordance with applicable sections of chapters 3, 4, and 5 of ACI 318 Building Code Requirement for Reinforced Concrete. Minimum compressive strength shall be 3000 psi. Admixtures containing chloride salts shall not be used. Additionally, all concrete constituents including but not limited to aggregates, sand, and water shall be closely monitored to assure that the chlorides do not exceed the limits proscribed in ACI 318.

1.5 QUALITY ASSURANCE

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

B. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those steel deck units tested for fire resistance per ASTM E 119 by a testing and inspection agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.

2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

C. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

2.0 PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Steel Deck:

a. BHP Steel Building Products USA Inc.
b. Consolidated Systems, Inc.
c. Epic Metals Corp.
d. Marlyn Steel Products, Inc.
e. Nucor Corp.; Vulcraft Div.
f. Roof Deck, Inc.
g. United Steel Deck, Inc.
h. Verco Manufacturing Co.
i. Wheeling Corrugating Co.; Div. of Wheeling-Pittsburgh Steel Corp.

2.2 MATERIALS

A. Fluted Deck and Metal Accessories: Sheet steel conforming to ASTM A 611 Grade C or ASTM A 653 SQ Grade 33 or Grade 40. Before fabrication, sheet steel shall receive ASTM A924-94 hot dip zinc coating with a minimum coating class of G60 (Z180) as defined in ASTM A653-94 or, except where specified or shown to be galvanized, and shall receive chemical cleaning, phosphate treatment, and baked on primer. Finish shall be evenly coated with no cracking after fabrication. Accessories shall be fabricated of not lighter than 18 US Standard Gage sheet steel.

1. Deck for Floor Construction: Galvanized deck uniformly deformed to insure a mechanical bond between concrete and steel. Metal accessories shall be galvanized.

B. Self-Drilling Fasteners: No. 12-14 x 3/4 inch, hex washer head, self-drilling fastener with pilot point.

C. Flexible Closure Strips: Manufacturer’s standard vulcanized, closed- cell, synthetic rubber closure strips.

2.3 COMPOSITE FLOOR DECK

A. Composite Steel Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 29, the minimum section properties indicated, and the following:

1. ASTM A 611, Grade C minimum.

2. Galvanizing: ASTM A 924, G 60.

3. Galvanizing Repair: Where galvanized surfaces are damaged, prepare surfaces and repair in accordance with procedures specified in ASTM A 780.

4. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.

5. Profile Depth: As indicated.

6. Design Uncoated-Steel Thickness: As indicated.

7. Span Condition: Single span.

B. Deck Fastening: Fasten deck units at ends and intermediate supports with arc spot welds (puddle welds) not less than 5/8 inch diameter, at 12 inches on centers, along the supporting members, unless more stringent requirements are indicated on the drawings or required by the fire resistance ratings indicated on the drawings. Weld the first and last deck flutes. Use welding washers for all deck lighter than 20 gage.

C. Side lap fastening: Fasten side laps at intervals not exceeding 36 inches, using one of the following methods, unless more stringent requirements are indicated on the drawings or required by the fire resistance ratings indicated on the drawings:

1. Mechanically fasten with self-drilling No.12 diameter or larger carbon steel screws.

2. Mechanically button punch.

D. Neatly field cut required openings, other than shop fabricated openings, after installation in accordance with the manufacturer’s recommendations.

E. Closures: Install flexible closure strips to effectively seal underside of flutes where fluted decks extend over exterior walls and also above interior partitions where there are no ceilings below the fluted deck

2.4 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8 mm) minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Steel Sheet Accessories: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.

G. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile indicated.

H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.

I. Galvanizing Repair Paint: ASTM A 780.

J. Repair Paint: Lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.

3.0 PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions, and requirements in this Section, and all applicable safety regulations.

B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.

C. Locate decking bundles to prevent overloading of supporting members.

D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

G. Column closures, end closures, side closures, rib closures, slab edge forms, and supplied reinforcements for small openings shall be fastened as indicated on the manufacturer's erection drawings.

H. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking, and support of other work.

I. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

J. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.3 FLOOR DECK INSTALLATION

A. Floor deck shall be fastened to all supporting members with 3/8" x 1" long arc seam welds at a nominal spacing of 8" on center or less as indicated on the manufacturer's erection drawings.

B. Sidelaps of composite deck shall be fastened together with 1" long fillet welds or #10 screws at a maximum spacing of 36" on center or less as indicated on the manufacturer's erection drawings. Sides of composite deck that are located at perimeter edges of the building shall be fastened to supporting members with 3/8" x 1" long arc seam welds at a spacing of 36" on center or less as indicated on the manufacturer's erection drawings.

C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm) with end joints as follows:

1. End Joints: Butted.

D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations, unless otherwise indicated.

E. Floor Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of decking. Weld cover plates at changes in direction of floor deck panels, unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing agency to perform field quality control testing.

B. Field welds will be subject to inspection.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work that does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.5 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.

1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.

2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Division 9 Section.

C. Repair Painting: Wire brushing, cleaning and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Division 9 Section.

D. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05310

SECTION 06 12 00 - STRUCTURAL INSULATED PANELS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Structural Insulated Panels (SIPs).

B. Related Sections: Section(s) related to this section include: None

1.02 SYSTEM DESCRIPTION

Structural Insulated Panels (SIPs) consist of oriented strand board (OSB) laminated with structural adhesives to a termite resistant EPS insulation core, an EPA registered treatment for mold, mildew, and termites, and SIP Manufacturer supplied connecting splines, sealants, and SIP screws.

1.03 REFERENCES

A. ACSE 7 - Minimum Loads for Buildings and other Structures.

B. ASTM C578 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

C. DOC PS2 – Performance Standard for Wood-based Structural-Use Panels.

D. ICC ES AC04 – Acceptance Criteria for Sandwich Panels.

E. ICC ES AC05 – Acceptance Criteria for Sandwich Panel Adhesives.

F. ICC ES AC12 – Acceptance Criteria for Foam Plastic Insulation.

G. ICC ES AC239 – Acceptance Criteria for Termite-Resistant Foam Plastics.

H. AWPA E1 - Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites.

I. AWPA E12- Standard Method of Determining Corrosion of Metal in Contact with Treated Wood.

J. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

K. EPA - Registered products listing.

1.04 DESIGN REQUIREMENTS

A. Provide SIPs which have been manufactured, fabricated and installed to withstand live loads of 40 lbs / square foot.

1.05 SUBMITTALS

A. Product Data: Submit product data for specified products.

1. SIP Code Compliance: Provide ICC ES code report for SIP with evidence of compliance with code requirements as an alternate method of construction. Submit current compliance report number from ICC ES showing conformance to the 2012 International Building Code (IBC) and International Residential Code (IRC). Code report shall include compliance with ICC ES AC04 (Sandwich Panels) dated February 2012.

2. EPS Code Compliance: Provide ICC ES code report for EPS foam with evidence of compliance with code. Submit current compliance report numbers from ICC ES with

conformance to the 2012 International Building Code (IBC) and International Residential Code (IRC). Code report shall include compliance with ICC ES AC12 (Foam Plastic) dated February 2011 and ICC ES AC239 (Termite-Resistance) dated October 2008.

3. Manufacturer's Instructions: SIP Manufacturer's Construction Manual and load design charts.

B. Calculations: Provide structural calculations by a registered architect or professional engineer in the State of New York qualified to perform such work.

C. Shop Drawings: Submit shop drawings for SIPs showing layout, elevations, product components and accessories.

D. Quality Assurance Submittals: Submit the following:

1. Certificate: Product certificate showing compliance to Third Party Quality Control program of PFS Corp.

E. Fire Resistant Assemblies: PFS construction number for each fire-rated assembly

F. Warranty: Warranty documents specified herein.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Installer should be experienced in performing work of this section and should have specialized in installation of work similar to that required for this project.

B. Source Limitations: Obtain all SIPs through one source. All accessories to be as furnished or recommended by the SIP manufacturer.

1.07 Regulatory Requirements:

A. SIPs shall be recognized for compliance with 2018 International Building Code in a current ICC ES evaluation report

B. Pre-installation Meeting: Conduct pre-installation meeting to verify project requirements, foundation/structural system/substrate conditions, SIP manufacturer installation instructions and SIP manufacturer warranty requirements.

1.08 DELIVERY, STORAGE & HANDLING

A. Ordering: Comply with SIP manufacturer ordering instructions and lead time requirements to avoid construction delays.

B. Delivery: Deliver materials from SIP manufacturer with identification labels or markings intact.

C. Off-load SIPs from truck and handle using fork lift or other means to prevent damage to SIPs.

D. SIPs shall be fully supported in storage and prevented from contact with the ground. Stack SIPs on pallets or a minimum of three stickers for every 8 feet of SIP length.

E. SIPs shall be fully protected from weather. Protect against exposure to rain, water, dirt, mud, and other residue that may affect SIP performance. Cover stored SIPs with breathable protective wraps. SIPs shall be stored in a protected area.

1.09 WARRANTY

A. Manufacturer's Warranty: Submit SIP manufacturer's standard warranty document. SIP Manufacturer warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

1. Warranty Period: Five (5) years commencing on Date of Substantial Completion.

PART 2 PRODUCTS

Note to Specifier Select the name and address of the local Licensed R-Control SIP Manufacturers/Suppliers.

2.01 MANUFACURERS/SUPPLIERS:

A. Thermal Foams Inc. Buffalo, NY

B. SIPs consisting of the following:

1. UL certified EPS core with Perform Guard treatment, minimum of 0.95 pcf (15.2 kg/m^3) complying with ASTM C578 Type I and having ICC ES recognition of termite resistance. Insulation manufacturer shall provide Third Party UL certificate. ICC ES report shall be provided for recognition of termite resistance in compliance with ICC AC239.
2. OSB identified with APA or TECO performance mark with Exposure I durability rating and performance in accordance with DOC PS-2 span rating 24/16 or greater.
3. Adhesives shall be in conformance with ICC ES AC05 – Acceptance Criteria for Sandwich Panel Adhesives
4. FrameGuard treatment for mold, mildew, and termite resistance meeting the following requirements:
    a. Registered with EPA.
    b. Mold growth: 0 rating, tested to ASTM D3273 for 8 weeks at 77 degrees F and 100 percent relative humidity.
    c. Termite resistance: Minimum rating of 7.0, tested to AWPA E-1.
    d. Corrosion potential for metals in contact with treated wood: Maximum 2 mils per year, tested to AWPA E12 for minimum of 60 days on aluminum 2024, carbon steel, hot-dip galvanized steel, and G90 galvanized steel.
    e. Equivalent lateral resistance and tooth holding capacity as untreated wood.

2.02 ACCESSORIES

A. Splines: OSB, block splines, or I-beam for use in joining SIPs shall be supplied by SIPs manufacturer.

B. Fasteners: corrosion resistant SIP screws compatible with SIP system shall be provided by the SIPs manufacturer.
    1. Wood Screws for attachment to wood members
    2. Heavy Duty Metal Screws for attachment to metal members (16 gauge to 3/16”)
    3. Light Duty Metal Screws for attachment to metal decks (18 gauge or thinner)

C. SIP Sealant: Shall be specifically designed for use with SIPs. Sealant must be compatible with all components of the SIP. Sealant shall be provided by the SIP manufacturer. VOC content of SIP sealant shall be less than 10 g/L.

D. Dimensional Lumber: SPF, #2 or better, or engineered equivalent unless otherwise required by structural drawings.

E. Vapor Barrier SIP Tape: woven and coated polyolefin membrane with synthetic adhesive suitable for indoor use, min. 4 inch wide for use on SIP joints as specified by designer. SIP Tape shall be supplied by the SIP manufacturer.

2.03 FABRICATION

A. Sizes: SIPs shall be fabricated in accordance with approved Shop Drawings

B. Thermal Resistance, R-value

1. 8 1/4" (210 mm) thick SIP with R-value of 29 at 75°F (32 at 40°F)

PRODUCT SUBSTITUTIONS

C. Substitutions: No substitutions permitted without fourteen day (14) prior approval.

2.04 RELATED MATERIALS

A. Related Materials: Refer to other sections for related materials as follows:

1. Dimensional Lumber: SPF #2 or better or pre-engineered equivalent

2.05 SOURCE QUALITY

A. Source Quality Assurance: Each SIP component required shall be supplied by SIP manufacturer and shall be obtained from selected SIP manufacturer or its approved supplier.

1. Each SIP shall be labeled indicating PFS Third Party certification.
2. Provide evidence of UL Third Party inspection and labeling of all insulation used in manufacture of SIPs.
3. SIP manufacturer shall provide Lamination, R-Value and warranty documents for building owner acceptance. Manufacturer standard forms will be submitted.
4. Dimensional Tolerance - shall comply with values listed in the manufacturer's Quality Control Manual.

B. Source Quality: Obtain SIPs from a single manufacturer.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's ICC ES report, Load Design Charts, Construction Manual, Shop Drawings, and product data, including product technical bulletins, for installation.

B. Plans shall be reviewed by a qualified architect/engineer and shall be signed and/or sealed. Deviations from standard detail and load design values shall be calculated and signed and/or sealed by a qualified architect/engineer.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

1. Verify conditions of foundation/structural system/substrate and other conditions which affect installation of SIPs. Any adverse conditions shall be reported in writing. Do not proceed with installation until adverse conditions are corrected.

3.03 INSTALLATION

A. SIP Installation:

Note to Specifier Complete installation recommendations are available from the manufacturer. SIP weight and contractor preference will dictate the erection method used. The use of a crane or lift truck may be required for SIP placement. Consult with SIP manufacturer for recommended handling methods. Supplementary lifting clamps and attachments to be provided by the contractor.

1. SIP Supports: Provide level and square foundation/structural system/substrate that support

wall and/or roof SIPs. For wall SIPs, hold sill plate back from edge of rim board 7/16" (11 mm) to allow full bearing of OSB skins. Provide 1 1/2" (38 mm) diameter access holes in plating to align with electrical wire chases in SIPs. Provide adequate bracing of SIPs during erection. Remove debris from plate area prior to SIP placement.

2. SIP Fastening: Connect SIPs by nails as shown on drawings. SIP sealant must be used together with each fastening techniques. Where SIP Screw Fasteners are used, provide a minimum of 1" (25.4 mm) penetration into support. Join SIPs using plates and splines. Secure attachment with nails, staples, or screws, and SIP sealant. Apply SIP sealant following SIP manufacturer recommendations.
3. SIP Tape: Provide SIP Tape at joints between SIP panels and at intersection of SIP roof and wall.
4. Vapor Retarders: Provide vapor retarders mandated by building code or climate conditions.
5. Thermal Barriers: Interior surfaces of SIPs shall be finished with a minimum 15-minute thermal barrier, such as 1/2" (13 mm) gypsum wallboard, nominal 1" (25 mm) wood paneling, or other approved materials. Apply code approved thermal barriers according to SIP manufacturer's recommendations.
6. Restrictions: Do not install SIPs directly on concrete. Do not put plumbing in SIPs without consulting SIP manufacturer. Do not overcut skins for field-cut openings and do not cut skins for electrical chases. SIPs shall be protected from exposure to solvents and their vapors that damage the EPS foam core.
7. Remove and replace insulated wall or roof SIPs which have become excessively wet or damaged before proceeding with installation of additional SIPs or other work.

3.04 FIELD QUALITY REQUIREMENTS

A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.05 PROTECTION

A. Protection: Protect installed product and finish surfaces from damage during construction.
   1. Roof SIPs: Protect roof SIPs from weather. Provide temporary protection at the end of the day or when rain or snow is imminent.
   2. After installation, cover SIPs to prevent contact with water on each exposed SIP edges and faces.

END OF SECTION

SECTION 06 13 00 – TIMBER FRAME

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the inventory, preparation, final structural design and detailing, fabrication, and erection of the barn as shown and described on the construction drawings. The structure shall be of timber frame construction using supplied, re-claimed, hand hewn timbers on a concrete slab foundation. The timber framer shall furnish all materials including connecting steel and hardware for a complete installation.

The Contractor is advised that compliance with the requirements of this specification may result in minor modifications to the contract drawings which can be handled with the shop drawings. The Contractor is fully responsible for all final structural detailing, fabrication, and installation of the barn, including the correct fitting of additional timber and steel tension connectors. Note the rafters will need to be new material.

Examine the contract drawings for requirements that affect the work in this section. The contract drawings require specific barn dimensions, structural members, roofing, siding, windows, doors, or other finishing details. Where this specification indicates ‘or as specified in the contract plans’, this does not indicate a choice. It indicates that the contract plans must be adhered to.

1.2 ACTION SUBMITTALS

A. Product Data: For all materials

B. Engineering Shop Drawings: Layout of structure, including connection of timber posts to the foundation, elevation and cross sections, and fabrication details for all wood members and steel assemblies. Include all pertinent dimensions, wood grades, drilled holes, fasteners or connectors.
1. Submit design calculations.
2. Furnish a NELMA or WWPA Certificate of Conformance for all sawn lumber
3. Provide a written warranty against defects in material and workmanship for a period of one year.

C. Samples:
1. Cable reinforcing: (1) One of each fitting type and not less than 24” inches long stainless-steel cable.

1.3 QUALITY ASSURANCE

A. Timber Frame Barn Contractor / Installer: Engage an experienced installer with at least 5 years of experience of projects of similar scope and materials. Contractor must be able to demonstrate successful completion of at least two (2) comparable projects. Submit all pertinent

qualifications information to demonstrate experience as noted under informational submittal above.

1.4 REMOVAL, PREPARATION, INVENTORY, DELIVERY, BARN ERECTION

A. Remove all timbers from storage facility, transport all timbers to Contractor's facility, Contractor is responsible for all transportation and equipment rental costs.

B. Clean existing dirt and debris off timbers using a wire brush and/or power washing tool. Contractor will exercise caution when cleaning timbers to prevent damage or excessive wear.

C. Removal all nails and other old building materials embedded in timbers, that will be exposed to view in the finished space.

D. Inspect and inventory all timbers for re-use in current design, including:
1. Structural integrity of each member
2. Structural integrity of existing mortises and tenons

E. Develop detailed Engineering Shop Drawings for joinery repair, including:
1. Layout of structure and planned assembly on foundation
2. Fabrication details for all joinery
3. All pertinent dimensions, wood grades, drilled holes, fasteners, connectors, and types of preservative treatment (if any)
4. Steel cable bracing system for walls

F. Repair and re-join mortises and tenons. Replace any damaged joints with suitable alternative methods as approved by Professional Engineer and Architect.

G. Size, engineer and fabricate barn rafters for roof system. Basis of design is rough sawn Eastern White Pine #2 and better. Final sizing and layout to be confirmed by Professional Engineer.

H. Schedule delivery of materials to avoid extended on-site storage and to avoid delaying the Work.

I. Store materials under cover and protected from weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings.

J. Deliver and offload all timbers, rafters, steel, and other building components to the building site. Contractor is responsible for all transportation and equipment rental costs.

K. Erect timber frame barn structure on foundation per approved Shop Drawings and Construction Documents.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Disassembled timber frame barn currently located in a storage facility.

B. Additional hand-hewn timbers will be supplied by the Town for use in repair or replacement of timbers for the barn that are deemed structurally un-sound.

C. New rafters

D. Steel cables, connectors, mounting brackets, and hardware required to reinforce the structure shall be ASTM A-36 and hardware to be ASTM A-307. Welding by certified welders per AWS specifications D1.5. All steel and hardware to be hot dipped galvanized.

E. End grain moisture protection material for bottoms of posts

2.2 FABRICATION

F. The contractor shall install and assemble the barn in accordance with the dimensions and details shown on the contract drawings.

G. All welded connections shall be completed by certified welders per AWS specifications.

END OF SECTION 06 11 00

SECTION 06 16 00 - HEMLOCK LUMBER

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hemlock products including the following:
1. Decking.
2. Siding.

1.2 RELATED SECTIONS: None

1.3 REFERENCES

A. PS 20 - American Softwood Lumber Standard - US Department of Commerce, National Institute of Standards and Technology.

1.4 SUBMITTALS

A. Samples of sizes and textures

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handle materials to avoid damage.

C. Store on a level surface with blocking to keep boards off the ground and provide uniform and adequate support.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.7 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: local saw mill

2.2 SIDING and ROOF DECKING

A. Material: Hemlock.

B. Grade:
   1. B Grade.

C. Texture:
   1. Saw-textured.

D. Thickness:
   1. 1 inch, nominal.

E. Width: equal distribution
   1. 6 inch, nominal.
   2. 8 inch, nominal.
   3. 10 inch, nominal.

F. Length:
   1. Length: 8 feet, minimum.
   2. Length: 16 feet, maximum.

G. Siding Patterns:
   1. Vertical butt edge

2.3 FASTENERS

A. Material: Hot-dip galvanized steel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Finish products in accordance with manufacturer's instructions.

C. Use only corrosion resistant fasteners. Acceptable are stainless steel or hot-dipped galvanized nails.

D. Joints shall fall over framing lumber and shall be double nailed. Do not nail any less than 1/2 inch from any edge and fasten at a minimum of every 24 inches on center.

E. Drive nails perpendicular to the framing lumber and the wood product; drive nails flush with the product's surface. Nails shall penetrate at least 1-1/4 inches into the structural framing.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 06 11 00

SECTION 073113 - ASPHALT SHINGLE ROOFING SYSTEMS

PART I – GENERAL

1.1 SECTION INCLUDES

A. Asphalt shingle roofing.
B. Moisture shedding underlayment, eaves, valley and ridge protection
C. Associated metal flashing

1.3 REFERENCES

A. ASTM D 225 – Standard Specification for Asphalt Shingles (Organic Felt) Surfaced with Mineral Granules.

.

B. ASTM D 1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials used as Steep Roofing Underlayment for Ice Dam Protection.

C. ASTM D 3018 – Standard Specification for Class A Shingles Surfaced with Mineral Granules.

D. ASTM D 3161 – Standard Test Method for Wind Resistance of Asphalt Shingles (Fan-Induced Method).

E ASTM D 3462 – Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.

F. ASTM D 4586 – Standard Specification for Asphalt Roof Cement, Asbestos-Free.

G. ASTM D-4869 – Standard Specification for Asphalt-Saturated Organic Felt Shingle Underlayment Used in Roofing.

H. ASTM D 6757 – Standard Specification for Inorganic Underlayment for use with Steep Slope Roofing Products.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria and product limitations.

B. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures

C. Certificate of Compliance: Provide Certificate of Compliance from an independent laboratory indicating that the asphalt fiberglass shingles made in normal production meet or exceed the requirements of the following:
1. ASTM E 108/UL 790 Class A Fire Resistance

2. ASTM D 3161/UL 997 Wind Resistance.
3. ASTM D 3462

1.5 QUALITY ASSURANCE

A. Installer Minimum Qualifications: Installer shall be licensed or otherwise authorized by all federal, state and local authorities to install all products specified in this section. Installer shall perform work in accordance with NRCA Roofing and Waterproofing Manual.

B. Pre-Installation Meeting – Conduct a pre-installation meeting at the site prior to commencing work of this section: Require attendance of entities directly concerned with roof installation.

Agenda will include:
1. Installation procedures and manufacturer's recommendations
2. Safety procedures
3. Coordination with installation of other work
4. Availability of roofing materials.
5. Preparation and approval of substrate and penetrations through roof.
6. Other items related to successful execution of work

D. Pre-Installation Meeting: Regulatory Requirements Products must conform with the following:
1. International Code Council – 2018

E. Maintain one copy of manufacturers application instructions on the project site.

F. Verify that manufacturer's label contains references to specified ASTM standards.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials and materials used with solvent based materials, in accordance with requirements of local authorities having jurisdiction.

C. Deliver shingles to site in manufacturer's unopened labeled bundles. Promptly verify quantities and conditions. Immediately remove damaged products from site.

1.7 PROJECT CONDITIONS

A. Anticipate and observe environmental conditions (temperature, humidity and moisture) within limits recommended by manufacturer for optimum results. Do not install products under environment conditions outside manufacturer's absolute limits.

B. Take special care when applying Waterproofing Shingle Underlayment and shingles when ambient or wind chill temperature is below 45 degrees F (7 degrees C). Tack Waterproofing

Shingle Underlayment in place if it does not adhere immediately to the deck.

1.8 WARRANTY

A. Manufacturer's Warranty: Furnish shingle manufacturer's warranty for the product listed below:

1. Fiberglass Shingles: 50 Years

B. Warranty Supplement: Provide manufacturer's supplemental warranty to cover labor and materials in the event of a material defect for the following period after completion of application of shingles:
1. First Ten Years

C. Warranty Transferability Clause: Make available to Owner shingle manufacturer's standard option for transferring warranty to a new owner.

D. Refer to manufacturer's warranty for adjustments for commercial applications.

E. Provide Upgraded Wind Warranty from 110 to 130 mph for first 15 years by complying with all manufacturers' conditions and instructions

PART II – PRODUCTS

2.1 MANUFACTURERS

Acceptable Manufacturer: CertainTeed Corporation

A. Substitutions: GAF, IKO, Owens Corning, Tamko, or approved equal.

2.2 ASPHALT SHINGLE ROOFING

A. CertainTeed Presidential Shake:
1. Conforming to ASTM D 3018 Type I – Self-Sealing; UL Certification of ASTM D 3462; ASTM D 3161 Class "F" (110-mph)/UL997 Wind Resistance and UL Class A Fire Resistance; glass fiber mat base; ceramically colored/UV resistant mineral surface granules across entire face of shingle, full two layer laminated four tab shingle.
2. Weight: 355 pounds per square (100 square feet) (17.3 kg/sq m)
3. Color: Charcoal Black

B. Approved equals: Acceptable alternate with similar shake pattern to CertainTeed Presidential, charcoal black, from GAF, IKO, Owens Corning, Tamko, or approved equal.

2.3 SHEET MATERIALS

A. Underlayment and Eaves Protection:
a. Waterproof Shingle Underlayment
i. ASTM D1970 sheet barrier of self-adhering rubberized asphalt membrane shingle underlayment having internal reinforcement and "split" back plastic release film;

provide material warranty equal in duration to that of shingles being applied

2.4 ACCESSORIES

A. Nails: Standard round wire type roofing nails, corrosion resistant; hot dipped zinc coated steel, aluminum or chormated steel; minimum 3.8 inch (9.5mm) head diameter; minimum 11 or 12 gage (2.5mm) shank diameter; shank to be sufficient length to penetrate through the roof sheathing or ¾ inch (19mm) into solid wood, plywood or non-veneer wood decking.

B. Asphalt Roofing Cement: ASTM D 4586, Type I or II

C. Snow Guard: Provide and install snow retention guards suitable for asphalt shingle roofing from one of the following manufacturers:
   a. TRA SNOW & SUN, Inc
   b. Alpine SnowGuards, a division of Vermont Slate & Copper Services, Inc.
   c. Berger Building Products, Inc.
   d. Approved equal

PART III – EXECUTION

3.1 EXAMINATION

A. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surfaces.

B. Verify deck surfaces are dry and free of ridges, warps or voids.

3.2 ROOF DECK PREPARATION

A. Follow shingle manufacturer's recommendations for acceptable roof deck material

B. Broom clean deck surfaces under eave protection and underlayment prior to their application

3.3 INSTALLATION – EAVE ICE DAM PROTECTION

A. Place eave edge and gable metal edge flashing tight with fascia boards. Weather-lap joints 2 inches (50mm). Secure flange with nails spaced 8 inches (200 mm) on center.

B. Apply waterproofing shingle underlayment as eave protection in accordance with manufacturer's instructions.

C. Extend eave protection membrane minimum 48 inches (640 mm) up slope beyond interior face of exterior wall.

3.4 INSTALLATION – PROTECTIVE UNDERLAYMENT

A. Roof Slopes 4:12 or Greater: Install one layer of asphalt felt shingle underlayment perpendicular to slope of roof and lap minimum 4 inches (100 mm) over eave protection.

B. Weather-lap and seal watertight with asphalt roofing cement items projecting through or mounted on roof. Avoid contact or solvent-based cements with waterproof shingle

underlayment.

3.5 INSTALLATION – VALLEY PROTECTION

A. For “closed-cut,” “woven,” and “open” valleys, first place one ply of waterproof shingle underlayment, minimum 36 inches (910 mm) wide, centered over valleys. Lap joints minimum of 6 inches (152 mm) Follow instructions of shingle a waterproofing membrane manufacturer.

3.6 INSTALLATON – METAL FLASHING

A. Weather-lap joints minimum 2 inches (50 mm).

B. Seal work projecting through or mounted on roof with asphalt roofing cement and make weather tight.

3.7 INSTALLATION - ASPHALT SHINGLES

A. Install shingles in accordance with manufacturer’s instructions for product type and application specified.

3.8 INSTALLATION – SNOW GUARDS

A. Install snow guards on east and west roofs above entries in accordance with manufacturer’s instructions for product type and application specified.

3.9 FIELD QUALITY CONTROL

A. Visual inspection of the work will be provided by Architect for approval prior to acceptance of final work.

3.10 PROTECTION OF FINISHED WORK

A. Do not permit traffic over finished roof surface.

END OF SECTION 07 31 13

SECTION 08 14 23 – Commercial Clad Wood Doors

GENERAL

1.1 SECTION INCLUDES

A. Aluminum clad exterior/ wood interior Clad Commercial Outswing Doors.

1.2 REFERENCES

A. AAMA - American Architectural Manufacturers Association:
1. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

B. AAMA/WDMA/CSA - American Architectural Manufacturers Association/Window and Door Manufacturers Association/Canadian Standards Association:
1. AAMA/WDMA/CSA 101./I.S.2/A440-11 - Standard/Specification for Windows, Doors and Unit Skylights.

C. ANSI - American National Standards Institute:
1. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

D. ASTM - American Society for Testing and Materials:
1. ASTM B 136 – Standard for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
2. ASTM B 137 – Standard for Measurement of Coating Mass Per Unit Area on Anodically Coated Aluminum.
3. ASTM B 244 – Standard for Measurement of Thickness of Anodic Coatings on Aluminum and of other Nonconductive Coating or Nonmagnetic Basis Metals with Eddy Current Instruments.
4. ASTM C1036 - Standard Specification for Flat Glass.
5. ASTM C1048 - Standard Specifications for Heat-Treated Glass - Kind HS, Kind FT Coated and Uncoated Glass.
6. ASTM D 3359 - Standard Test Methods for Measuring Adhesion by Tape Test.
7. ASTM D 5235 - Standard Test Method for Microscopical Measurement of Dry Film Thickness of Coatings on Wood Products.
8. ASTM D 5572 - Standard Specification for Adhesives Used for Finger Joints in Nonstructural Lumber Products.
9. ASTM D 5751 - Standard Specification for Laminate Joints in Nonstructural Lumber Products.

E. NFRC - National Fenestration Rating Council:
1. NFRC 102 – Procedure for Measuring the Steady-State Thermal Transmittance of

Fenestration Systems.

2. NFRC 200 – Procedures for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
3. NFRC 500 – Procedure for Determining Fenestration Product Condensation Resistance Values.

1.3 DEFINITIONS

A. U Cog: Units Btu/(hr•ft2•□F), center-of-glass U value. Center-of-glass is the central glazed portion of the window which one sees through that is more than 2.5 inches from sightline.

B. U/R Total: Value of total unit calculated per NFRC 100 using window and frame. U Factor is the primary measure of winter energy efficiency. A low U Factor means less heat passes through the unit due to exterior air and roomside air temperature differences. R Value = 1/U.

C. SHGC: The solar heat gain coefficient of the total fenestration system represents the solar heat gain through the system relative to the incident solar radiation striking the exterior surface. Solar Heat Gain Ratings are determined in accordance with NFRC 200.

D. Vtc: The visible transmittance of the total fenestration system is the transmittance across the visible portion of the solar spectrum where sensitivity to each wave length is weighted by the eye's response. Visible Transmittance Ratings are determined in accordance with NFRC 300.

1.4 THERMAL PERFORMANCE RATING.

A. Glazing Type and Finish
   1. U Tot., NFRC 100: 0.35
   2. Solar Heat Gain Coefficient (SHGC), NFRC 200: 0.17
   3. Visible light transmission (Vtc), NFRC 300: 0.26

1.5 SUBMITTALS

A. Shop Drawings: Submit under provisions of Section 01300.

1.6 QUALITY ASSURANCE

A. Product Requirements:
   1. Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
   2. Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging in an upright position off the ground in a clean, dry area until ready for installation.

B. Prime or seal wood surfaces if more than 30 days between delivery and installation.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify door openings by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

A. Warranty: Provide manufacturer’s standard warranty as follows.
   1. Workmanship and Materials: 10-year limited warranty.
   2. Insulating Glass: 20-year limited warranty (Residential and Commercial).
   3. Exterior Clad Finish:
      a. Commercial and Residential 2604 Metal Clad Warranty: 10-year limited warranty on metal clad coating against cracking, checking, color change, chalking or peeling (adhesion loss).
   4. Interior Finish: 2-year limited warranty.
   5. Warranty Labor: 2-year limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Sierra Pacific Windows

B. Substitutions: Andersen, Marvin, Kolbe, or approved.

2.2 MATERIALS

A. Wood: Ponderosa Pine, kiln dried to moisture content of 6 to 12 percent at time of fabrication; water-repellent preservative treated in accordance with WDMA I.S.4.
   1. Grade and Grain:
      a. Interior Exposed Wood: Solid clear, suitable for staining or painting.

B. Aluminum Cladding: Extruded 6063 T5 grade aluminum.
   1. Frame Cladding Thickness: 0.062 inch.
   2. Panel Cladding Thickness: 0.075 inch.

C. Glazing: Provide manufacturer’s standard glazing material.
   1. Safety Glass: ASTM C 1048, glazing select quality, Kind FT (Fully Tempered) 1/8 inch thick [minimum].

2.3 COMPONENTS

A. Hardware:
   1. Push Bar: 36 inch stainless steel or aluminum crash bar exit device
   2. Lock Set: Commercial-grade standard lockset, lockable from exterior
   3. Hinges: 4.5 inches by 4.5 inches ball-bearing, stainless steel non-removable pin.

B. Sill: Extruded low profile aluminum sill (ADA compliant).

C. Weatherstripping:
   1. Head and Side Jambs: Vinyl-covered foam Q-Lon weatherstrip.
   2. Panel Tops: Leaf type weatherstrip.
   3. Panel Bottoms: Pemko door sweeps.

D. Premium quality flat glass complying with ASTM C 1036.

E. Factory-Glazed Fabrication: Comply with requirements of AAMA/WDMA 101/I.S.2/NAFS.
   1. Safety Glass: Provide laminated and tempered products complying with testing requirements in 16 CFR 1201, for Category II materials.

F. Glazed with silicone sealant to the exterior and removeable interior glazing bead.

G. Glass Type: Standard Low-E Insulated Glass (IG).

H. Grilles
   1. Type:
      a. Simulated Divided Lite (SDL): Combination of applied wood interior grille bars, spacer within the airspace of the IG, with applied exterior grille bars
      b. Simulated Divided Lite (SDL): Traditional 5/8 inch (16 mm) width.
   2. Pattern: Equal.

2.4 CONSTRUCTION

A. Frame: 1-1/2” (38 mm) thick frame, 5-11/16” overall frame depth, 0.050” (1.3 mm) extruded aluminum, mitered corners with screw boss exterior, and interior wood for head, sill and jamb, kiln dried to a moisture content of 6-12% at time of fabrication.

B. Sash: 1-3/4” (44 mm) [2” (51 mm)] thick sash, wood profiles utilizing dowel design. Stile and head rail cladding is 0.093” (2.36 mm) thick, bottom rail cladding is 0.125” (3.17 mm) thick.

C. Interior: Solid wood species. Pine (standard).

D. Coreguard: Wood parts are dip treated in accordance with WDMA I.S.4.

E. Extension Jambs: 6 9/16” match interior wood

2.5 FINISH

A. Interior Finish: Natural Pine

B. Exterior Finish: To be manufacturer’s pre-treated aluminum surface with baked on, electrostatically applied super durable polyester powder paint, zero-VOC finish conforming to specified AAMA 2604 or AAMA 2605 test procedures.
   1. Standard Cladding Exterior Finish: AAMA 2604; Color: White 001

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

C. Finished Windows: Replace windows that are damaged or do not comply with requirements. Windows may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 23

SECTION 08 30 00 – BARN DOORS & HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sliding barn doors including the following:
1. Doors.
2. Hardware.

1.2 SUBMITTALS

A. Samples of sizes and textures of boards

B. Product data for hardware.

C. Shop Drawings.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handle materials to avoid damage.

C. Store on a level surface with blocking to keep boards off the ground and provide uniform and adequate support.

1.4 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.5 WARRANTY

A. Provide manufacturer’s warranty to cover labor and materials in the event of a material defect for a period of (2) Two years after completion.

1.6 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: local woodworking shop

B. Acceptable Distributor for door hardware: Richelieu

2.2 SLIDING BARN DOOR TRACK

A. Material: Galvanized steel

B. Heavy Duty Box Rail: (3) at 10’ in length for front door, (2) at 8’ for rear door

C. Box Rail Door Hardware Kit: Need one kit per door: allows for 1 ½” to 3 ½” thick door of maximum 450 pounds. Use ball bearing roller type, part # 24651387XB.

D. Bracket: wall mounted; must add bracket in addition to hardware kit for 30 foot of track.

2.3 SLIDING BARN DOOR

A. Finish Material: Hemlock. Note: structural material can be pressure treated pine or white oak.

B. Grade:
1. B Grade.

C. Texture:
1. Saw-textured.

D. Thickness:
1. 1 inch, nominal.

E. Width: equal distribution
1. 6 inch, nominal.
2. 8 inch, nominal.
3. 10 inch, nominal.

F. Length:
1. Length: 12 feet, minimum.
2. Length: 12 feet, maximum.

G. Profile:
1. Vertical tongue & groove, REFER TO ARCHITECTURE ELEVATIONS.

H. Cap Flashing: Flash top of door with galvanized 26 gauge steel bent in U shape with vertical leg to be a minimum of 2” depth. Attachment with compatible screws on vertical faces.

I. Finish: Solid body stain (2) coats all six faces.

2.4 FASTENERS

A. Material: STAINLESS STEEL.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until siding have been properly finished.

B. If siding preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Finish products in accordance with manufacturer's instructions.

C. Use only corrosion resistant fasteners. Acceptable are stainless steel or hot-dipped galvanized fasteners.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 08 30 00

SECTION 08 54 73 – Aluminum Clad Composite Windows

GENERAL

1.1 SECTION INCLUDES

A. Aluminum clad exterior / wood interior H3 Fusion Tech Double Hung windows with hardware.

1.2 RELATED SECTIONS

1.3 REFERENCES

A. AAMA - American Architectural Manufacturers Association:
   1. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
   2. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

B. AAMA/WDMA/CSA - American Architectural Manufacturers Association/Window and Door Manufacturers Association/Canadian Standards Association:
   1. AAMA/WDMA/CSA 101./I.S.2/A440-11 - Standard/Specification for Windows, Doors and Unit Skylights.

C. ANSI - American National Standards Institute:
   1. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
   2. ANSI-SMA-1004 – Aluminum Tubing Framing Screens for Windows.

D. ASTM - American Society for Testing and Materials:
   1. ASTM C1036 - Standard Specification for Flat Glass.
   2. ASTM C1048 - Standard Specifications for Heat-Treated Glass - Kind HS, Kind FT Coated and Uncoated Glass.
   3. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Difference Across the Specimen.
   4. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
   5. ASTM E413 and E90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
   6. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference.
   7. ASTM E2188 - Standard Test Method for Insulating Glass Unit Performance.
   8. ASTM E2189 - Standard Test Method for Testing Resistance to Fogging in insulated Glass.

E. FS – Federal Specification
   1. FS L-S-125B – Screen, Insect Non-Metallic.

F. IGCC - Insulated Glass Certification Council.

G. IGMA – Insulating Glass Manufacturers Alliance.

H. NAAMM - National Association of Architectural Metal Manufacturers - Metal Finishes Manual for Architectural and Metal Products.

I. NFRC - National Fenestration Rating Council:
   1. NFRC 102 – Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems.
   2. NFRC 200 – Procedures for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
   3. NFRC 500 – Procedure for Determining Fenestration Product Condensation Resistance Values.
   4. Energy Star Compliant Models available.

1.4 DEFINITIONS

A. Performance Class Designations:
   1. R (Residential): Commonly used in one and two-family dwellings.
   2. LC (Light Commercial): Commonly used in low-rise multi dwellings, low rise professional offices, libraries and low-rise motels.
   3. CW or C (Commercial): Commonly used in low-rise and mid-rise building and factories, hotels and retail sales buildings.
   4. AW or H (Heavy Commercial): Commonly used in high-rise and mid-rise buildings to meet increased loading requirements and limits on deflection and in buildings where frequent and extreme use of the fenestration products is expected. For example; hospitals, schools, institutions, dormitories, government or public buildings, and other buildings where heavy use of fenestration products is expected.

B. Performance Grade (PG) Designations: Actual design pressure that is designated by a number following the type and class designation in pounds force per square foot.

C. Minimum test size: The smallest size unit permitted for performance class (gateway test size). Products must be tested at the minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.5 PERFORMANCE REQUIREMENTS.

A. Air infiltration (air leakage) shall not exceed the following when tested at 1.57 psf when tested in accordance with ASTM E283: 0.30 cfm per square foot of frame.

B. Water penetration resistance - There shall be no water penetration when tested at 7.52 psf pressure in accordance with ASTM E547.

C. Structural load testing - Product shall meet the damaged and permanent deflection pass/fail criteria as stated in AAMA/WDMA/CSA 101 I.S.2/A440-11 when tested in accordance with ASTM E330.

1.6 THERMAL PERFORMANCE RATING

A. Glazing Type and Finish
   1. U-Value: 0.28
   2. Solar Heat Gain Coefficient (SHGC): 0.26
   3. Visible Light Transmission (VT): 0.46

1.7 SUBMITTALS

A. Shop Drawings: Submit under provisions of Section 01300.

1.8 QUALITY ASSURANCE

A. Product Requirements:
   1. Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
   2. Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging in an upright position off the ground in a clean, dry area until ready for installation.

B. Prime or seal wood surfaces if more than 30 days between delivery and installation.

1.10 PROJECT CONDITIONS

A. Field Measurements: Verify wood window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.11 WARRANTY

A. Warranty: Provide manufacturer’s standard warranty as follows.
   1. Workmanship and Materials: 10-year limited warranty.
   2. Insulating Glass: 20-year limited residential warranty (Residential and Commercial).
   3. Exterior Clad Finish:
      a. Commercial and Residential 2604 Metal Clad Warranty: 10-year limited warranty on metal clad coating against cracking, checking, color change, chalking or peeling (adhesion loss).
   4. Interior Finish: 2-year limited warranty.
   5. Warranty Labor: 2-year limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Sierra Pacific Windows

B. Substitutions: Approved equal from Andersen, Marvin or Kolbe.

2.2 APPLICATIONS/SCOPE

Refer to Window Schedule on the drawings for application and location.

A. H3 2.0 Fusion Tech Double Hung / Awning / Casement:
   1. Aluminum Clad H3 Fusion Tech Operating Double Hung / Awning / Casement as manufactured by Sierra Pacific Windows.
      a. Performance: LC-PG50, standard product, maximum size 47.5 inches (1206mm) by 83.5 inches (2121 mm). Single unit only.
   2. Jamb width: 6 9/16”
   3. Operating Hardware: Truth dual action cam sweep lock; Spring loaded Deco tilt latches on top and bottom sash comprised of zinc die-cast and high impact nylon.

2.3 GLAZING

A. Premium quality flat glass complying with ASTM C 1036.

B. Factory-Glazed Fabrication: Comply with requirements of Section 08810 and with AAMA/WDMA 101/I.S.2/NAFS.
   1. Safety Glass: Provide laminated and tempered products complying with testing requirements in 16 CFR 1201, for Category II materials.

C. Sandwich-glazed with closed-cell foam glazing tap on the interior and silicone sealant to the exterior.

D. Glass Type: Standard Low-E Insulated Glass (IG).

E. Specialty Glass Type: None

A. Grilles
   1. Type:
      a. Simulated Divided Lite (SDL): Combination of applied wood interior grille bars, spacer within the airspace of the IG, with applied exterior grille bars
      b. Simulated Divided Lite (SDL): Traditional 5/8 inch (16 mm) width.
   2. Pattern: Equal.

2.4 CONSTRUCTION

A. Frame: 1-11/16 inch (43mm) thick frame, 3 part construction using 0.078” (2 mm) aluminum extrusion with fully welded corner joints, 0.055” (1.39 mm) extruded aluminum, mitered corners with screw boss exterior, and interior wood for head, sill and jamb, kiln dried to a moisture content of 6-12% at time of fabrication. Overall frame depth is 5-3/4 inches (147mm), 4-9/16 inch (116mm) basic jamb depth, with 15 degree sill and weep system.

B. Sash: 1-3/4” (44 mm) thick sash, wood profiles utilizing mortise and tenon design. 0.055” (1.39 mm) extruded exterior sash cladding mitered and assembled with injectable corner keys. Constructed with aluminum interlocking checkrail.

C. Interior: Solid wood species. Pine (standard).

D. Coreguard: Wood parts are dip treated in accordance with WDMA I.S.4.

E. Extension Jambs: 6 9/16” match interior wood

F. Weatherproofing: Dual weatherstip system to include primary closed-cell foam weatherstrip on perimeter of frame with secondary PVB bulb type weatherstrip applied to all four sides of the sash.

G. Brickmold: 2 inch brickmold supplied by window manufacturer is required for awning windows in basement.

2.5 FINISH

A. Interior Finish: Natural Pine

B. Exterior Finish: To be manufacturer’s pre-treated aluminum surface with baked on, electrostatically applied super durable polyester powder paint, zero-VOC finish conforming to specified AAMA 2604 or AAMA 2605 test procedures.
1. Standard Cladding Exterior Finish: AAMA 2604; Color: White 001

2.6 HARDWARE

A. Finish: White

2.7 SCREENS

A. Screen Frame: Standard with PVC coated spring steel frame with integrated insect screen mesh with no exposed fasteners. Screen frame profile to measure 11/64” x 5/16”.

B. Screen fabric: 18x16 Charcoal fiberglass mesh

C. Screen Finish: White

2.8 FABRICATION

A. Fabricate wood windows in sizes indicated.

B. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator, unless otherwise indicated.

C. Factory machine windows for openings and for hardware that is not surface applied.

D. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

C. Finished Windows: Replace windows that are damaged or do not comply with requirements. Windows may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 54 73

SECTION 26 00 00 – ELECTRICAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical for outlets, switching and lighting:
   1. 200 A Panel box in basement
   2. Junction boxes.
   3. Wire

1.2 RELATED SECTIONS

A. Section 06 12 00 – SIP

B. Section 06 13 00 - Timber Frame

1.3 SUBMITTALS

A. None

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handle materials to avoid damage.

1.5 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.6 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Square D, Carlon, Hoffman

B. Approved equal

2.2 PANEL

A. Material: Painted steel

B. 200A, 120/240 volt, single phase

C. 40 space, 80 circuit

D. All circuits to be 20A

2.3 JUNCTION BOXES

A. Material: PVC

B. New Work: 14 cu. in. for outlets

C. Single gang for outlets, triple gang for switching at entry door

2.4 WIRING

A. Material: Romex, 12 gauge

PART 3 EXECUTION

3.1 INSTALLATION

A. Stud wall: Install wiring from outside in stud wall cavity prior to installation of wall sheathing.

B. Cut in junction boxes into interior hemlock siding.

C. Label all wires and cap junction boxes.

D. Ceiling: pre-wire at ridge above t & g ceiling boards for three ceiling hung fixtures

E. Timber Frame Beams: pre-wire for up-lighting

3.2 LOCATION ALLOTMENT

A. Emergency Exit light and sign circuit in two locations above entry door and future side door.

B. Basement: Panel only, no outlets or lighting junction boxes.

C. Walls: allotment of 16 outlets on four circuits.

D. Switching: 3 lighting circuits to three gang junction box at entry door;
1. Ridge: 3 ceiling hung fixture locations centered between four timber bents
2. Timber connectors on 4 bents: wiring for LED up-lighting fixture on top of horizontal timber.
3. Exterior barn gooseneck fixture locations above two sliding barn doors.

END OF SECTION 08 30 00