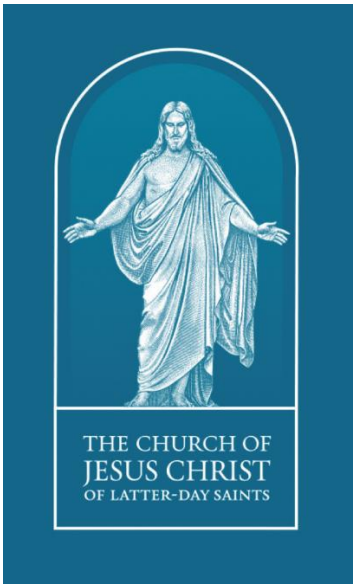
PROJECT MANUAL

FOR

Montpelier Tabernacle Misc Work

Project Number
501402623010101



DESIGN WEST

255 South 300 West
Logan, Utah 84321
435.752.7031
Architects Project # 224075

October 18, 2024

SECTION 00 0110
TABLE OF CONTENTS

PROCUREMENT AND CONTRACTING REQUIREMENTS

1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

SPECIFICATIONS

3.01 DIVISION 01 -- GENERAL REQUIREMENTS

3.02 DIVISION 02 -- EXISTING CONDITIONS

3.03 DIVISION 03 -- CONCRETE

3.04 DIVISION 04 -- MASONRY

3.05 DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

3.06 DIVISION 09 -- FINISHES

3.07 DIVISION 31 -- EARTHWORK

3.08 DIVISION 32 -- EXTERIOR IMPROVEMENTS

END OF SECTION 00 0110

SECTION 00 7300
SUPPLEMENTARY CONDITIONS

SUPPLEMENTARY CONDITIONS

FOR SMALL PROJECT AGREEMENT BETWEEN OWNER AND CONTRACTOR (U.S.)

ITEM 1 - GENERAL

1. Conditions of the Small Project Agreement Between Owner and Contractor (U.S.) apply to each Division of the Specifications.

2. Provisions contained in Division 01 apply to all Divisions of the Specifications.

ITEM 2 - LIQUIDATED DAMAGES PAYABLE TO OWNER

This section may be included as a separate additional paragraph to the Small Project Agreement Between Owner and Contractor (U.S.), at Owner's discretion:

Delay in Completion of the Work. For each day after the expiration of the designated Time of Completion that Contractor has not completed the Work, Contractor will pay Owner the amount of two hundred fifty dollars ($250.00) per day as liquidated damages for Owner's loss of use and the added administrative expense to Owner to administer the Project during the period of delay. In addition, Contractor will reimburse Owner for any additional Architect's fees, attorneys' fees, expert fees, consultant fees, copy costs, and other expenses incurred by Owner as a result of the delay. Owner may deduct any liquidated damages or reimbursable expenses from any money due or to become due to Contractor. If the amount of liquidated damages and reimbursable expenses exceeds any amounts due to Contractor, Contractor will pay the difference to Owner within ten (10) days after receipt of a written request from Owner for payment.

ITEM 3 - STATE SPECIFIC SUPPLEMENTARY CONDITIONS

Alabama

N/A

Alaska

N/A

Arizona

Replace section 5.b. of the Agreement with the following:

b. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for Work completed within seven (7) days after:
   1. Contractor submits to Owner Contractor's payment request for Work to date;
   2. Contractor provides to Owner a certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request;
   3. Contractor has obtained releases of all mechanics' liens and claims of subcontractors, laborers, or material suppliers who supplied labor and/or materials for the Work covered by the payment request; and
   4. Owner has certified and approved all or part of the payment request and notified Contractor in writing (which Owner must do within 14 days of Contractor's submission of the payment request to Owner).

   Owner may modify or reject the payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.

Arkansas

N/A

California

N/A

Colorado

COLORADO STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Contractor will make an application to State Department of Revenue for certificate of exemption to permit purchase of building materials for construction of this Project without payment of Sales Tax. Applications and certificates will be on forms provided by the Department of Revenue.

2. Prior to start of construction, Contractor will furnish to the Owner copies of the applications submitted and certificates obtained. Upon receipt of the certificate Contractor shall make a copy for each subcontractor involved in the Project and complete it by filling in the subcontractor's name and address and signing it. The original certificate and copies of all certificates that the Contractor issues to subcontractors should be kept at the Contractor's place of business for a minimum of three years.

3. The Owner's sales tax exemption number for the State of Colorado is 98-01587.

Connecticut

CONNECTICUT STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Sales of materials and supplies that will be physically and permanently incorporated into the construction project should be exempt from Connecticut state sales tax. The Owner's sales tax exemption number for the State of Connecticut is E-9613.

Delaware

N/A

District of Columbia

WASHINGTON D.C. SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Materials that will be physically incorporated into and made a part of the Owner's real property may be purchased by the Contractor free of Washington D.C. sales tax.

2. The Owner's tax exempt number is 8661-0185848-001.

3. Contractor is responsible for submitting the Tax Exempt Purchase Certificate Form for real property projects on behalf of the Owner.

Florida

NOTICE OF COMMENCEMENT

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

Before commencing the Project, Contractor shall record a notice of commencement in the clerk's

office and post a certified copy thereof. The notice of commencement shall substantially comply with the form in Florida Statutes 713.13 and contain the following information:

1. A description sufficient for identification of the real property to be improved. The description should include the legal description of the property and also should include the street address and tax folio number of the property if available or, if there is no street address available, such additional information as will describe the physical location of the real property to be improved.
2. A general description of the improvement.
3. The name and address of the owner, the owner's interest in the site of the improvement, and the name and address of the fee simple titleholder, if other than such owner. A lessee who contracts for the improvements is an owner as defined under Florida Statutes s. 713.01(23) and must be listed as the owner together with a statement that the ownership interest is a leasehold interest.
4. The name and address of the contractor.
5. The name and address of the surety on the payment bond under Florida Statutes s. 713.23, if any, and the amount of such bond.
6. The name and address of any person making a loan for the construction of the improvements.
7. The name and address within the state of a person other than himself or herself who may be designated by the owner as the person upon whom notices or other documents may be served under this part; and service upon the person so designated constitutes service upon the owner.

Georgia

N/A

Hawaii

N/A

Idaho

N/A

Illinois

ILLINOIS STATE CONTRACTOR TO PROVIDE NOTICE OF SUBCONTRACTORS:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

> Contractor shall provide to Owner a statement of names and addresses of all those furnishing for this Project labor, services, material, fixtures, apparatus or machinery, and form or forms work, as well as the amounts due or to become due to such persons / entities. Such notice shall be in writing and under oath or verified by affidavit. Notwithstanding any provision to the contrary, Owner is not required to make payments to Contractor until Contractor provides Owner sufficient evidence of Contractor's compliance with this notice requirement.

ILLINOIS STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Sales of materials to construction contractors for incorporation into the Owner's real estate may be exempt from Illinois state sales tax. (Sales of tools, fuel, lumber for forms, and other end use or consumption items to contractors who do not incorporate these items into real estate are subject to Illinois state sales tax.)

2. Contractor will obtain and provide subcontractors and suppliers with a certificate that
    - States the construction contractor's purchases are for conversion into real estate under a contract with the Owner;
    - Identifies the Owner by name and address; and

- States on what date the contract was entered into.

The Contractor will also provide subcontractors and suppliers with the sales tax exemption number for Owner. The Owner's sales tax exemption number for the State of Illinois is E9986-4045-06.

Indiana

INDIANA STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Purchase of materials and supplies might be exempt from Indiana state sales tax. In the event that the Project qualifies for a sales and use tax exemption, the Owner's sales tax exemption number for the State of Indiana is 7343965.

Iowa

N/A

Kansas

KANSAS STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Upon obtaining a certificate of tax exemption for the project, an exemption from Kansas state sales tax should be allowed for tangible personal property and services purchased by Contractor for the project. Purchases of construction machinery, equipment or tools for the project are not exempt but rather are subject to state sales tax.

2. Prior to beginning work on the project, Contractor will assist the Owner in making a timely application to the State for a certificate of tax exemption for the project. After the certificate of tax exemption is obtained from the State, Contractor will furnish the number of the certificate to all suppliers from whom it makes purchases; and all such suppliers shall execute invoices covering the items purchased bearing the number of such certificate. In addition, upon completion of the project, Contractor will timely furnish to Owner a sworn statement (on the form provided by the Kansas Director of Taxation) that all purchases made under such exemption certificate were entitled to the tax exemption. All invoices for such tax exempt purchases shall be held by Contactor for a period of five years.

Kentucky

N/A

Louisiana

N/A

Maine

MAINE STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. The General Contractor should be exempt from Maine state sales tax on its purchases for this project.

2. The Owner's tax exempt number is 20460.

Maryland

MARYLAND STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. The General Contractor should be exempt from Maryland state sales tax on its purchases for this project.

2. The Owner's tax exempt number is 29020063.

Massachusetts

MASSACHUSETTS STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. The General Contractor and its subcontractors should be exempt from Massachusetts state sales tax on purchases for this project. Contractors will obtain and complete state form ST-5C and submit it to Owner for signature and return. Contractor will then use the completed Purchase Certificate in making purchases for this Project.

2. The Owner's tax exempt number is E870-234-341.

Michigan

NOTICE OF COMMENCEMENT

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

Before commencing the Project, Contractor shall record a Notice of Commencement in the office of the register of deeds for each county in which the real property to be improved is located and post a copy thereof in a conspicuous place on the property. The notice of commencement shall substantially comply with the form in Michigan Compiled Laws 570.1108 and contain the following information:

1. The legal description of the real property on which the improvement is to be made conforming with Michigan Compiled Laws sections 560.212 and 560.255.
2. The name, address, and capacity of the signor for the Owner.
3. The name and address of Owner's designee signing on behalf of Owner.
4. The name and address of the general contractor, if any.
5. The following statement:

   To lien claimants and subsequent purchasers:

   Take notice that work is about to commence on an improvement to the real property described in this instrument. A person having a construction lien may preserve the lien by providing a notice of furnishing to the above-named designee and the general contractor, if any, and by timely recording a claim of lien, in accordance with law.

   A person having a construction lien arising by virtue of work performed on this improvement should refer to the name of the Owner or lessee and the legal description appearing in this Notice. A person subsequently acquiring an interest in the land described is not required to be named in a claim of lien.

   A copy of this Notice with an attached form for notice of furnishing may be obtained upon making a written request by certified mail to the above-named Owner or lessee; the designee; or the person with whom you have contracted.
6. The name and address of the person preparing the Notice.
7. An affidavit of the Owner or the agent of the Owner which verifies the Notice.

Contractor must provide to Owner a copy of the Notice as well as prepare and provide to Owner the Affidavit verifying the Notice for Owner's signature no later than seven (7) days prior to the time Contractor needs to receive the Affidavit back from Owner in order for Contractor to timely finalize and record the Notice of Commencement with its attachments.

In addition to recording and posting the Notice of Commencement, Contractor shall provide the Notice of Commencement and a blank notice of furnishing (described in Michigan Compiled Laws 570.1108), from

time to time, to the property Owner as well as all subcontractors, laborers, or suppliers who request the Notice of Commencement.

CONTRACTOR TO PROVIDE SWORN STATEMENTS

Notwithstanding all other terms and conditions of the Contract Documents, Owner has the right (but no obligation) to require Contractor to submit to Owner a sworn statement that complies with Michigan Compiled Laws 570.1110 prior to the time payment is due or otherwise from time to time.

Minnesota

N/A

Mississippi

N/A

Missouri

MISSOURI STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. The Church of Jesus Christ of Latter-day Saints is a Religious Organization exempt from sales tax in accordance with Section 144.062 RSMO as modified by the 1994 Missouri General Assembly.

2. The Owner will furnish a 'Missouri Project Exemption Certificate' and a MO Tax Exemption Letter' to the Contractor.

3. The Owner's tax exempt number is 12473863.

Montana

N/A

Nebraska

NEBRASKA STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Pursuant to applicable laws, Contractor will make application to The Nebraska Department of Revenue to act as prime contractor for approval to use Owner's tax exempt number to permit the purchase of building materials for construction of this Project without payment of sales and use tax. Contractor may delegate its authority to its subcontractors as allowed by law to act as the purchasing agent for tax exemption purposes. Subcontractors shall follow the same application and compliance requirements as the Contractor. Applications will be on forms provided by The Nebraska Department of Revenue.

2. Prior to start of construction, Contractor will furnish copies of the submitted application forms to Owner.

Nevada

NEVADA NOTICE OF COMPLETION:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

A. Within five (5) calendar days of final completion of the Project and in compliance with Section 108.228 Nevada Revised Statutes, Contractor shall, on behalf of the Owner, file with the office of the county recorder of the county where the property is located, and copy to Owner, a notice of completion which shall include, without limitation, the following:

1. The date of completion of the work of improvement;
2. The owner's name, the address of the owner, and the nature of the title of any person signing the notice;
3. A description of the property sufficient for identification;
4. The name of the prime contractor or contractors, if any.

Contractor shall verify the notice of completion on the Owner's behalf.

B. Upon recording the notice, Contractor shall within ten (10) days deliver a copy of the notice by certified mail to each prime contractor and each potential lien claimant who, before the notice was recorded, either submitted a request to the owner to receive the notice or delivered a preliminary notice of right to lien.

C. Notwithstanding any other provision of the Contract Documents to the contrary, Contractor and Owner agree that any breach or failure to comply with this Section by the Contractor will constitute a breach of contract and the Contractor will be liable for any direct, indirect, or consequential damages to the Owner flowing from this breach.

N/A

New Hampshire

N/A

New Jersey

NEW JERSEY STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. The General Contractor should be exempt from New Jersey state sales tax on its purchases for this project.

2. The Owner's tax exempt number is EO-237-300-405.

New Mexico

NEW MEXICO STATE PROGRESS PAYMENT AND FINAL PAYMENT:

Replace section 5. of the Small Project Agreement Between Owner and Contractor (U.S.) with the following:

5. Payment.

a. If the Contractor's Bid Proposal Amount is over $100,000, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner will be used as a basis for reviewing Contractor's payment requests.

b. Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor for work completed within twenty-one (21) days after the following:
   (1) Owner receives Contractor's undisputed payment request for work to date;
   (2) Owner receives a certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
   (3) Contractor has obtained releases of all mechanics' liens and claims of subcontractors, laborers, or material suppliers who supplied labor and/or materials for the Work covered by the payment request.

c. Owner may modify or reject the payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.

d. Owner will make full and final payment within twenty-one (21) days of the completion of all of the following requirements:
    1. Contractor has submitted to Owner Contractor's final payment request;
    2. Architect, if any, has declared to Owner in writing that the Work is complete; and
    3. Contractor has obtained waiver and release upon final payment documents executed by all of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request; and
    4. Contractor has provided to Owner all manufacturers' and other warranties and guaranties, properly signed and endorsed to Owner. (Delivery of such guaranties and warranties will not relieve Contractor of any obligation assumed under any other provision of the Contract Documents.)

NEW MEXICO STATE PAYMENT OF SUBCONTRACTORS AND MATERIALMEN:

Add the following section to the Small Project Agreement Between Owner and Contractor (U.S.):

11. **Payment of Subcontractors and Materialmen.** Contractor will promptly pay for all labor, materials, and equipment used to perform the Work. Contractor agrees to make prompt payment to its subcontractors within seven (7) days of Contractor's receipt of payment from Owner for that portion of the funds received which represents the subcontractor's portion of the Work completed to Contractor's satisfaction for which payment was made by Owner. Failure of Contractor to make payment within that seven (7) day period will subject Contractor to pay interest to its subcontractors on the undisputed amount at one and one-half percent per month or fraction of a month until payment is issued. Contractor agrees to require of its subcontractors that they make prompt payment to their subcontractors within seven (7) days of their receipt of payment from the Contractor for that portion of the funds received which represents their subcontractor's portion of the Work completed and to be subject to interest at one and one-half percent per month on undisputed amounts not paid to their subcontractors within that seven (7) day period.

New York

NEW YORK STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Exemption from tax is allowed for materials sold to the Contractor for this project. For equipment rentals as well as any materials not used in the building, the Contractor is subject to New York sales tax.

2. The Owner's tax exempt number is 105318.

North Carolina

NORTH CAROLINA STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. At end of each calendar quarter, Contractor will provide Owner with the following information from invoices for materials and sub-contract work where North Carolina sales tax has been paid:
    a. Date of invoice
    b. Amount of tax
    c. Name and address of person or company.

LIEN AGENT

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

Where the Contract Sum exceeds Thirty Thousand Dollars ($30,000), Contractor on behalf of Owner shall, simultaneous with the execution of the Agreement and at Contractor's sole expense, obtain and

maintain throughout the duration of the Project a lien agent for the Project in satisfaction of North Carolina statutes G.S. § 44A-11.1 & § 44A-11.2. In addition, Contractor shall satisfy all notice requirements under applicable law regarding the lien agent, including, without limitation, providing written information of the lien agent in the building permit and/or on a sign posted and maintained on the Project Site.

North Dakota

N/A

Ohio

OHIO STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Contractor's purchases of materials to be used for this project should be exempt from Ohio state sales tax. Contractor will issue exemption certificates to suppliers.

OHIO STATE NOTICE OF COMMENCEMENT:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. In accordance with State of Ohio lien laws, Owner may file Notice of Commencement with the County Recorder of the county in which the Project is located and provide a copy of that notice to Contractor. Contractor will be responsible for distributing notice to subcontractors and suppliers.

Oklahoma

OKLAHOMA STATE SALES TAX

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. The General Contractor and its subcontractors should be exempt from Oklahoma state sales tax on purchases for this project.
2. The Owner will provide a copy of its exemption documentation.
3. In compliance with Oklahoma Rule 710:65-7-13, Contractor will, on the face of each invoice or sales receipt, set out the name of the Owner, that the purchases are being made on behalf of the Owner, and that the purchases are necessary for the completion of the Agreement.

Oregon

N/A

Pennsylvania

PENNSYLVANIA STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Sales of certain materials to construction contractors for incorporation into the Owner's real estate may be exempt from Pennsylvania state sales tax. Pennsylvania law 72 P.S. § 7201 allows construction contractors to claim the Owner's sales tax exemption for "Building Machinery and Equipment" that is transferred pursuant to the construction contract to the Owner. "Building Machinery and Equipment" is "[g]eneration equipment, storage equipment, conditioning equipment, distribution equipment and termination equipment" limited to the following:
    i. air conditioning limited to heating, cooling, purification, humidification, dehumidification and ventilation;
    ii. electrical;

iii. plumbing;
iv. communications limited to voice, video, data, sound, master clock and noise abatement;
v. alarms limited to fire, security and detection;
vi. control system limited to energy management, traffic and parking lot and building access;
vii. medical system limited to diagnosis and treatment equipment, medical gas, nurse call and doctor paging;
viii. laboratory system;
ix. cathodic protection system; or
x. furniture, cabinetry and kitchen equipment.

The definition also explicitly includes: boilers, chillers, air cleaners, humidifiers, fans, switchgear, pumps, telephones, speakers, horns, motion detectors, dampers, actuators, grills, registers, traffic signals, sensors, card access devices, guardrails, medial devices, floor troughs and grates and laundry equipment, together with integral coverings and enclosures, whether or not the item constitutes a fixture or is otherwise affixed to the real estate whether or not damage would be done to the item or its surroundings upon removal or whether or not the item is physically located within a real estate structure.

However, the term "building machinery and equipment" shall not include guardrail posts, pipes, fittings, pipe supports and hangers, valves, underground tanks, wire, conduit, receptacle and junction boxes, insulation, ductwork and coverings thereof.

2. Contractor will obtain and provide subcontractors with Pennsylvania Exemption Certificates—Pennsylvania Form Rev-1220 AS—to be filled out and used when purchasing tax-exempt “Building Machinery and Equipment” for the project. For purposes of filling out Form Rev-1220 AS, the Owner’s tax exempt number is 75-259-773.

3. If Contractor or any subcontractor fails to obtain a sales-tax exemption when purchasing “Building Machinery and Equipment,” the Contractor or subcontractor shall be responsible for seeking its own refund of sales tax expending by filing a Refund Petition with the Pennsylvania Department of Revenue Board of Appeals.

Rhode Island

RHODE ISLAND STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Exemption from Rhode Island state sales tax should be allowed for materials purchased by Contractor for this project. Equipment rentals as well as materials not used in the building are subject to state sales tax.

2. The Owner’s tax exempt number is 11034.

South Carolina

N/A

South Dakota

Replace section 11 of the Small Project Agreement Between Owner and Contractor (U.S.) with the following:

11. Permits, Surveys, and Taxes. Contractor will obtain and pay for all permits and licenses. Contractor will pay all privilege, sales, use, consumer, payroll, workers compensation, unemployment, old age pension, surtax, and similar taxes assessed in connection with the

performance of the Work (including without limitation all excise tax). Contractor will also obtain and pay for any surveys it needs to perform the Work.

Tennessee

N/A

Texas

TEXAS STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. The Church of Jesus Christ of Latter-day Saints is a Religious Organization exempt from sales tax under Texas Tax Code §151.310. The general Contractor, when purchasing materials and equipment for this Project, should advise the vendors that Owner is an exempt organization and that no sales tax will be paid.

Utah

UTAH STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Contractors should be exempt on purchases of material installed or converted into real property to be used by the Owner. The Contractor will furnish each vendor with a completed Exemption Certificate Form TC-721. The certificate will be prepared by the Contractor for each vendor in order to obtain the exemption.

2. The Owner's tax exempt number is 11871701-002-STC.

UTAH NOTICE OF INTENT TO OBTAIN FINAL COMPLETION:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

A. Contractor shall file with the State Construction Registry, on its own behalf and/or on behalf of Owner, a notice of intent to obtain final completion at least 45 days before the day on which the Owner or Contractor files or could file a notice of completion under Utah Code Ann. Section 38-1a-506 if:
    1. The completion of performance time under the original contract for construction work is greater than 120 days;
    2. The total original construction contract price exceeds $500,000; and
    3. The original contractor or owner has not obtained a payment bond in accordance with Utah Code Ann. Section 14-2-1.

UTAH NOTICE OF COMPLETION:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

A. Within five (5) calendar days of final completion of the Project and in compliance with Section 38-1a-507 Utah Code Annotated, Contractor shall file with the State Construction Registry, and copy to Owner, a notice of completion which shall include, without limitation, the following:
    1. The name, address, telephone number, and email address of the person filing the notice of completion;
    2. The name of the county in which the Project and/or Project site is located;
    3. The date on which final completion is alleged to have occurred;
    4. The method used to determine final completion; and
    5. One of the following:
        a. The tax parcel identification number of each parcel included in the Project and/or Project site;

b. The entry number of a preliminary notice on the same project that includes the tax parcel identification number of each parcel included in the Project and/or Project site; or
c. The entry number of the building permit issued for the Project.

B. Notwithstanding any other provision of the Contract Documents to the contrary, Contractor and Owner agree that any breach or failure to comply with this Section by the Contractor will constitute a breach of contract and the Contractor will be liable for any direct, indirect, or consequential damages to the Owner flowing from this breach.

UTAH STATE PROGRESS PAYMENTS AND FINAL PAYMENT:

Replace paragraph 5 of the Small Project Agreement Between Owner and Contractor (U.S.) with the following:

5. <u>Payment</u>

a. If the Contractor's Bid Proposal Amount is over $100,000, Contractor will submit to Owner a schedule of values which allocates the Contractor's Bid Proposal Amount to various portions of the Work. This schedule, when accepted by Owner, will be used as a basis for reviewing Contractor's payment requests.

b. Progress Payments: Not more than once each month, Contractor will submit a payment request to Owner. Owner will pay Contractor progress payments for work completed within fifteen (15) days after Owner receives:
   1. Contractor's progress payment request for work to date;
   2. A certification by Contractor that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the current payment request; and
   3. Conditional Waiver and Release Upon Progress Payment documents submitted by Contractor (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's progress payment request.

c. Final Payment: Owner will make full and final payment of the Contract Sum due within thirty (30) days of the completion of all of the following requirements:
   1. Contractor has submitted its final payment request;
   2. Contractor has submitted a certification that Contractor has paid for all labor, materials, and equipment relating to the Work covered by prior payment requests and that Contractor will pay for all labor, materials, and equipment relating to the Work covered by the final payment request; and
   3. Contractor has submitted Waiver and Release Upon Final Payment documents (in content complying with Utah Code § 38-1a-802) executed by each of the subcontractors performing work and/or providing materials covered by the Contractor's final payment request.

   Acceptance of final payment by Contractor or any Subcontractor will constitute a waiver of claims by the payee except for those claims previously made to Owner in writing and identified by Contractor in its affidavit as still pending.
   If the aggregate of previous payments made by Owner exceeds the amount due Contractor, Contractor will reimburse the difference to Owner.

d. Owner may modify or reject any payment request if, in Owner's opinion, the Work for which payment is requested is not acceptable or is less complete than represented on the payment request.

e. Upon receipt of any payment from Owner, Contractor will pay to each Subcontractor the amount paid to Contractor on account of such Subcontractor's portion of the Work.

f. Contractor will maintain a copy of each payment request at the Project site for review by the Subcontractors.

g. No payment made, either in whole or in part, by Owner will be construed to be an acceptance of defective or improper materials or workmanship.

Vermont

VERMONT STATE SALES TAX:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. Purchases of building materials and supplies should be exempt from Vermont state sales tax if those materials and supplies are consumed in the construction of this Project.

2. The Owner's tax exempt number is 450-870234341F-01.

Virginia

N/A

Washington

WASHINGTON STATE CONTRACTOR DISCLOSURE NOTICE:

Add the following to the Small Project Agreement Between Owner and Contractor (U.S.):

1. For Projects in state of Washington, the Contractor will provide a 'job site' disclosure notice in accordance with Statute 60.04.230. Contractor will post this notice at the job site. This notice will detail the following:
   a. Legal description and street address of the construction site.
   b. Property Owner's name address, and phone number as shown in the Contract Documents.
   c. Contractor's registration number and identification.
   d. Contractor's business name, address, and telephone number.

WASHINGTON STATE COMPENSATION:

Replace section 4 in the Small Project Agreement Between Owner and Contractor (U.S.) with the following:

1. **Compensation.** Owner will pay Contractor for performance of Contractor's obligations under the Contract Documents the sum of _____ Dollars ($_____) (the "Contract Sum"), plus applicable sales tax. This Contract Sum includes all labor, materials, equipment, tools, costs, expenses, work and services of Contractor and its subcontractors necessary to perform the Work in accordance with the terms of this Agreement, including without limitation travel, communications, and copying costs.

West Virginia

N/A

Wisconsin

N/A

Wyoming

N/A

END OF DOCUMENT

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

B. Procedures for preparation and submittal of application for final payment.

1.02 SCHEDULE OF VALUES

A. Submit schedule of values as directed by Owner's representative within 24 hours of project bid. Coordinate preparation of schedule of values with preparation of Contractor's Construction Schedule. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:
   1. Contractor's Construction Schedule.
   2. Payment Request form.
   3. Schedule of Allowances.
   4. Schedule of Alternates.

B. Electronic media printout including equivalent information may be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

1.03 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Use Payment Request forms provided by Owner.

C. Provide following submittals before or with submittal of Initial Payment Request:
   1. List of Subcontractors.
   2. Initial progress report.
   3. Contractor's Construction Schedule.
   4. Submittal Schedule.

D. Each Payment Request will be consistent with previous requests and payments certified by Architect and paid for by Owner.

E. Electronic media printout including equivalent information may be considered in lieu of standard form specified; submit sample to Architect for approval.

F. Forms filled out by hand will not be accepted.

G. Execute certification by signature of authorized officer.

H. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed.

I. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

J. Submit copy of each Application for Payment.

K. Construction progress schedule, revised and current as specified in Section 01 3216.

1.04 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Provide Affidavit of Contractor and Consent of Surety with Payment Request following Substantial Completion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General administrative requirements.

B. Preconstruction meeting.

C. Progress meetings.

D. Pre-Installation Conferences

E. Submittals for review, information, and project closeout.

F. Submittal procedures.

1.02 GENERAL ADMINISTRATIVE REQUIREMENTS

A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

B. Project designation for this Project is [Insert Project Designation]. This Project designation will be included on documents generated for Project by Contractor and Subcontractors, or be present on a cover letter accompanying such documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

A. Architect will schedule a meeting after Notice of Award.

B. Architect will record minutes and distribute copies within three working days after meeting to participants and those affected by decisions made.

3.02 PROGRESS MEETINGS

A. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Progress meetings will be open to Owner, Architect, Subcontractors, and anyone invited by Owner, Architect, and Contractor.

C. Architect will record minutes and distribute copies within three working days after meeting to participants and those affected by decisions made.

3.03 PRE-INSTALLATION CONFERENCES

A. Attend pre-installation conferences specified in Contract Documents.
   1. If possible, schedule these conferences on same day as regularly scheduled Progress Meetings. If this is not possible, coordinate scheduling with Architect.
   2. Request input from attendees in preparing agenda.

B. See individual specification sections for information to include in Pre-Installation Conferences.

C. Architect will record minutes and distribute copies within three working days after meeting to participants and those affected by decisions made.

3.04 SUBMITTAL SCHEDULE

A. Submit to Architect for review a schedule for submittals in tabular format, listing items specified to be furnished for review to Architect including product data, shop drawings, samples, and Informational Submittals.
   1. Submit at the same time as the preliminary schedule or 20 days after receipt of Notice to Proceed.
   2. Coordinate with Contractor's construction schedule.

3. Format schedule to allow tracking of status of submittals throughout duration of construction.
4. Enclose the following information for each item:
   a. Scheduled date for first submittal.
   b. Related Section number.
   c. Submittal category.
   d. Name of Subcontractor.
   e. Description of part of the Work covered.
   f. Scheduled date for resubmittal.
   g. Scheduled date for Architect's final release or approval.
5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
   a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.
   b. Print and distribute copies to Architect and Owner and post copy in field office. When revisions are made, distribute to same parties and post in same location.
   c. Revise schedule monthly. Send copy of revised schedule to Owner and Architect and post copy in field office.

3.05 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.06 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer's instructions.
   6. Manufacturer's field reports.
   7. Field engineering daily reports.
   8. Special Procedure Submittals: Describe submittals intended to document special procedures. An example would be construction staging or phasing for remodeling an existing facility while keeping it in operation. While the Contractor would normally be responsible for managing this, submittal of his plan as documentation could be specified.
   9. Qualification Statements: Describe submittals intended to document qualification of entities employed by Contractor.
   10. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   4. Bonds.
   5. Project Manual: Complete Project Manual including Addenda and Modifications as defined in General Conditions.
   6. Record Documentation: Describe submittal of record documentation specific to the Section.
   7. Software: Describe submittal system software and programming software specific to the Section.

D. Final Property Survey.

E. Submit for Owner's benefit during and after project completion.

3.08 MAINTENANCE MATERIAL SUBMITTALS

A. This title groups maintenance material required submittals specific to the Section. Items may be provided at completion of Work or submitted with section 01 7800 - Closeout Submittals:
   1. Spare Parts: Describe spare parts necessary for Owner’s use in facility operation and maintenance. ‘Parts’ are generally understood to be items such as filters, motor drive belts, lamps, and other similar manufactured items that require only simple replacement.
   2. Extra Stock Materials: Describe extra stock materials to be provided for Owner’s use in facility operation and maintenance. Extra stock materials are generally understood to be items such as ceiling tiles, flooring, paint etc.
   3. Tools:
      a. Describe tools to be provided for Owner’s use in facility operation and maintenance. Tools are generally understood to be wrenches, gauges, circuit setters, etc, required for proper operation or maintenance of a system.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

3.10 SUBMITTAL PROCEDURES

A. General Requirements:
   1. Identification:
      a. Place permanent label or title block on each submittal for identification. Include name of entity that prepared each submittal on label or title block.
         1) Provide space approximately 4 by 5 inches on label or beside title block on Shop Drawings to record Contractor's review and approval markings and action taken.
         2) Include following information on label for processing and recording action taken:
            (a) Project name.
            (b) Date.
            (c) Name and address of Architect.
            (d) Name and address of Contractor.
            (e) Name and address of Subcontractor.
            (f) Name and address of supplier.
            (g) Name of manufacturer.
            (h) Number and title of appropriate Specification Section.
            (i) Drawing number and detail references, as appropriate.
   2. Use a single transmittal for related items.
   3. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.

4. Transmit using approved form.
    a. Use Contractor's form, subject to prior approval by Architect.
5. Sequentially identify each item. For revised submittals use original number and a sequential "R" suffix.
6. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
7. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
8. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    a. Deliver submittals to Architect at business address.
    b. Send submittals in electronic format via email to Architect.
9. Schedule submittals to expedite the Project, and coordinate submission of related items.
    a. For each submittal for review, allow 21 days excluding delivery time to and from the Contractor.
    b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 10 days.
    c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
10. No extension of Contract Time will be authorized because of failure to transmit submittals to Architect in sufficient time before work is to be performed to allow processing.

B. Product Data Procedures:
1. Mark each copy of each set of submittals to show choices and options used on Project. Where printed Product Data includes information on products that are not required for Project, mark copies to indicate information relating to Project.
2. Certify that proposed product complies with requirements of Contract Documents. List any deviations from those requirements on form or separate sheet.
3. Submit only information required by individual specification sections.
4. Collect required information into a single submittal.
5. Submit concurrently with related shop drawing submittal.
6. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Do not reproduce Contract Documents to create shop drawings.
3. Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches. Highlight, encircle, or otherwise show deviations from Contract Documents. Include following information as a minimum:
    a. Dimensions.
    b. Identification of products and materials included.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
4. Review and designate (stamp) approval of shop drawings. Unless otherwise specified, submit to Architect six copies of shop drawings required by Contract Documents. Shop drawings not required by Contract Documents, but requested by Contractor or supplied by Subcontractor, need not be submitted to Architect for review.

D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.
4. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
    a. Mount, display, or package Samples to ease review of qualities specified. Prepare Samples to match samples provided by Architect, if applicable. Include following:
        1) Generic description of Sample.
        2) Sample source.
        3) Product name or name of manufacturer.
        4) Compliance with recognized standards.
        5) Availability and delivery time.
5. Submit Samples for review of kind, color, pattern, and texture, for final check of these characteristics with other elements, and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
    a. Where variations in color, pattern, texture or other characteristics are inherent in material or product represented, submit set of three samples minimum that show approximate limits of variations.
    b. Refer to other specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
    c. Refer to other Sections for Samples to be returned to Contractor for incorporation into The Work. Such Samples shall be undamaged at time of use. On transmittal, indicate special requests regarding disposition of Sample submittals.
6. Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit full set of choices for material or product. Preliminary submittals will be reviewed and returned with Architect's mark indicating selection and other action.
7. Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three sets. One will be returned marked with action taken.
8. Samples, as accepted and returned by Architect, will be used for quality comparisons throughout course of construction.
    a. Unless noncompliance with Contract Documents is observed, submittal may serve as final submittal.
    b. Sample sets may be used to obtain final acceptance of construction associated with each set.

END OF SECTION

BLANK PAGE

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preliminary schedule.

B. Construction progress schedule, bar chart type.

C. Construction progress schedule, with network analysis diagrams and reports if required by Owner.

D. Daily Construction Reports.

1.02 SUBMITTALS

A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.

B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.

1. Include written certification that major contractors have reviewed and accepted proposed schedule.

D. Within 10 days after joint review, submit complete schedule.

E. Submit updated schedule with each Application for Payment.

1.03 SCHEDULE FORMAT

A. Provide separate time bar for each construction activity listed on Owner's payment request form.

B. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

C. Sheet Size: Multiples of 8-1/2 x 11 inches.

D. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Provide separate time bar for each construction activity listed on Owner's payment request form.

C. Identify each item by specification section number.

D. Identify work of separate stages and other logically grouped activities.

E. Provide sub-schedules to define critical portions of the entire schedule.

F. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

G. Indicate delivery dates for owner-furnished products.

H. Coordinate content with schedule of values specified in Section 01 2000 - Price and Payment Procedures.

I. Provide legend for symbols and abbreviations used.

3.03 ACCELERATION OF WORK

A. Complete The Work in accordance with Construction Schedule. If Contractor falls behind schedule, take such actions as are necessary, at no additional expense to Owner, to bring progress of The Work back in accordance with schedule.

B. Owner may request proposal for completion of The Work at date earlier than expiration of Contract Time:
   1. Promptly provide requested proposal showing cost of such acceleration of The Work. Consult with Owner and Architect regarding possible options to decrease cost of such acceleration.
   2. If Owner determines to order acceleration of The Work, change in Contract Sum and Contract Time resulting from acceleration will be included in a Change Order.

3.04 BAR CHARTS

A. Provide separate time bar for each construction activity listed on Owner's payment request form.

B. Include a separate bar for each major portion of Work or operation.

C. Identify the first work day of each week.

D. Project Management Software Programs:
   1. Any software project management program capable of Bar Chart Scheduling for projects of equal size and complexity is approved by Contractor and approved by Owner’s Project Manager.

3.05 NETWORK ANALYSIS IF REQUIRED BY OWNER

A. Prepare network analysis diagrams and supporting mathematical analyses using the Critical Path Method.

B. Illustrate order and interdependence of activities and sequence of work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.

C. Mathematical Analysis: Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
   1. Preceding and following event numbers.
   2. Activity description.
   3. Estimated duration of activity, in maximum 15 day intervals.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Total and free float; float time shall accrue to Owner and to Owner's benefit.
   11. Monetary value of activity, keyed to Schedule of Values.
   12. Percentage of activity completed.
   13. Responsibility.

D. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, accepting revised completion dates, and re-computation of all dates and float.

E. Required Reports: List activities in sorts or groups:
   1. By preceding work item or event number from lowest to highest.
   2. By amount of float, then in order of early start.
   3. By responsibility in order of earliest possible start date.
   4. In order of latest allowable start dates.
   5. In order of latest allowable finish dates.
   6. Contractor's periodic payment request sorted by Schedule of Values listings.

7. Listing of basic input data that generates the report.
8. Listing of activities on the critical path.

3.06 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Architect at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.07 UPDATING SCHEDULE

A. Update schedule monthly.

B. Maintain schedules to record actual start and finish dates of completed activities.

C. Indicate progress of each activity to date of revision, with projected completion date of each activity.

D. Annotate diagrams to graphically depict current status of Work.

E. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

F. Indicate changes required to maintain Date of Substantial Completion.

G. Submit reports required to support recommended changes.

H. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

3.08 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

3.09 DAILY CONSTRUCTION REPORTS

A. Prepare daily reports utilizing means and methods as defined by the Owner.

B. Prepare daily reports of operations at Project including at least the following information:
   1. Approximate count of personnel at site.
   2. High and low temperatures, general weather conditions.
   3. Materials, equipment, or Owner-furnished items arriving at or leaving site.
   4. Accidents and unusual events.
   5. Site or structure damage by water, frost, wind, or other causes.
   6. Stoppages, delays, shortages, losses.
   7. Any tests made and their result if known.
   8. Meter readings and similar recordings.
   9. Emergency procedures.
   10. Orders and requests of governing authorities.
   11. Services connected, disconnected.
   12. Equipment or system tests and start-ups.
   13. Brief summary of work accomplished that day.
   14. Signature of person preparing report.

C. Submit daily reports to Architect at least weekly unless directed to submit reports on owner provided project management software.

D. Maintain copies of daily reports at field office.

END OF SECTION

BLANK PAGE

SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. Qualifications.

D. Testing and inspection agencies and services.

E. Contractor's construction-related professional design services.

F. Contractor's design-related professional design services.

G. Control of installation.

H. Mock-ups.

I. Tolerances.

J. Manufacturers' field services.

K. Defect Assessment.

1.02 REFERENCE STANDARDS

A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection 2021.

1.03 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.

B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
   1. Temporary sheeting, shoring, or supports.
   2. Temporary scaffolding.
   3. Temporary bracing.
   4. Temporary falsework for support of spanning or arched structures.
   5. Temporary foundation underpinning.
   6. Temporary stairs or steps required for construction access only.
   7. Temporary hoist(s) and rigging.
   8. Investigation of soil conditions and design of temporary foundations to support construction equipment.

1.04 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.

B. Base design on performance and/or design criteria indicated in individual specification sections.
   1. Submit a Request for Interpretation to Architect if the criteria indicated are not sufficient to perform required design services.

1.05 SUBMITTALS

A. General: Additional submittal requirements are specified in Individual Sections in Division 01 through Division 50.

B. Certificates:
   1. Testing Agency will submit certified written report of each inspection, test, or similar service.

C. Tests and Evaluation Reports:

1. Testing Agency or Agencies will prepare logs, test reports, and certificates applicable to specific tests and inspections and deliver copies (or electronic record) distributed as follows:
   a. 1 copy to Owner's Representative.
   b. 1 copy to Architect.
   c. 1 copy to Consulting Engineers (Engineer of Record).
   d. 1 copy to General Contractor.
   e. 1 copy to Authorities Having Jurisdiction (if required).
2. Other tests, certificates, and similar documents will be obtained by Contractor and delivered to Owner's Representative and Architect in such time as not to delay progress of the Work or final payment therefore.
3. Submittal Format:
   a. Schedule of Tests and Inspections: Prepare in tabular form and include following:
      1) Specification Section number and title.
      2) Description of test and inspection.
      3) Identification of applicable standards.
      4) Identification of test and inspection methods.
      5) Number of tests and inspections required.
      6) Time schedule or time span for tests and inspections.
      7) Entity responsible for performing tests and inspections.
      8) Requirements for obtaining samples.
   b. Certified written reports of each inspection, test, or similar service will include, but not be limited:
      1) Date of issue.
      2) Project title and number.
      3) Name, address, and telephone number of Testing Agency.
      4) Dates and locations of samples and tests or inspections.
      5) Names of individuals making tests and inspections.
      6) Description of the Work and test and inspection method.
      7) Identification of product and Specification Section.
      8) Complete test or inspection data.
      9) Test and inspection results and an interpretation of test results.
      10) Record of temperature and weather conditions at time of sample taking and testing and inspecting.
      11) Comments or professional opinion on whether tested or inspected Work complies with Contract Document requirements.
      12) Name and signature of laboratory inspector.
      13) Recommendations on retesting and re-inspecting.

D. Source Quality Control Submittals:
   1. Testing Agency will submit following prior to commencing the Work:
      a. Qualifications of Testing Agency management and personnel designated to project.
      b. Testing Agency 'Written Practice for Quality Assurance'.
      c. Qualification records for Inspector and non-destructive testing technicians designated for project.
      d. Testing Agency non-destructive testing procedures, equipment calibration records, and personnel training records.
      e. Testing Agency Quality Control Plan for monitoring and control of testing operations.
      f. Welding Inspection Procedures (Structural Steel testing).
      g. Bolting Inspection Procedures (Structural Steel testing).
      h. Shear Connector Stud Inspection Procedures (Structural Steel testing).
      i. Seismic Connections Inspection Procedures (Structural Steel testing).

E. Testing and Inspection Reports:

1. Conduct and interpret tests and inspections and state in each report whether tested and inspected the Work complies with or deviates from requirements.
2. Laboratory Reports: Testing Agency will furnish reports of materials and construction as required, including:
    a. Description of method of test.
    b. Identification of sample and portion of the Work tested.
        1) Description of location in the Work of sample.
        2) Time and date when sample was obtained.
        3) Weather and climatic conditions at time when sample was obtained.
    c. Evaluation of results of tests including recommendations for action.
3. Inspection Reports:
    a. Testing Agency will furnish ‘Inspection at Site’ reports for each site visit documenting activities, observations, and inspections.
    b. Include notation of weather and climatic conditions, time and date conditions and status of the Work, actions taken, and recommendations or evaluation of the Work.
4. Reporting Testing and Inspection (Conforming Work):
    a. Submit testing and inspection reports as required within twenty four (24) hours of test or inspection having been performed.
5. Reporting Testing and Inspection Defective Work (Non-Conforming Work):
    a. Testing Agency, upon determination of irregularities, deficiencies observed or test failure(s) observed in the Work during performance of its services of test or inspection having been performed, will:
        1) Verbally notify results to Architect, Contractor, and Owner’s Representative within one hour of test or inspection having been performed (if Defective Work (Non-Conforming Work) is incorporated into project).
        2) Submit written inspection report and test results as required within twenty four (24) hours of test or inspection having been performed.
    b. Prepare non-compliance log to track non-compliant testing or inspections.
6. Final Report:
    a. Submit final report of tests and inspections at Substantial Completion, which identify unresolved deficiencies.

1.06 QUALIFICATIONS

A. Qualifications paragraphs in this Article establish minimum qualification levels required; individual Specification Sections specify additional requirements:
    1. Fabricator / Supplier / Installer Qualifications: Firm experienced in producing products similar to those indicated for this Project and with record of successful in-service performance, as well as sufficient production capacity to produce required units.
        a. Approved:
            1) Where heading ‘Approved Suppliers / Distributors / Installers / Applicators / Fabricators' is used to identify list of specified suppliers / distributors / installers / applicators / fabricators, use only listed suppliers / installers / fabricators.
            2) No substitutions will be allowed.
        b. Acceptable Suppliers / Installers:
            1) Where heading ‘Acceptable Suppliers / Installers / Fabricators' is used, qualifications as specified in Quality Assurance in Part 1 of individual sections will be used to determine requirements of those that will be acceptable to be used on Project. Lists for acceptable installers can include additional installers that may be approved before bidding or by addendum.
    2. Factory-Authorized Service Representative Qualifications:
        a. Authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
    3. Installer Qualifications:

a. Firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

4. Manufacturer Qualifications:
   a. Firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
5. Manufacturer's Field Services Qualifications:
   a. Experienced authorized representative of manufacturer to inspect field-assembled components and equipment installation, including service connections.
6. Professional Engineer Qualifications:
   a. Professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of kind indicated. Engineering services are defined as those performed for installations of system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
7. Specialists:
   a. Certain sections of Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations.
   b. Specialists shall satisfy qualification requirements indicated and shall be engaged for activities indicated.
   c. Requirement for specialists shall not supersede building codes and regulations governing the Work.
8. Testing Agency Qualifications:
   a. Independent Testing Agency with experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
      1) Testing Laboratory:
         (a) AASHTO Materials Reference Laboratory (AMRL) Accreditation Program.
         (b) Cement and Concrete Reference Laboratory (CCRL).
         (c) Nationally Recognized Testing Laboratory (NRTL): Nationally recognized testing laboratory according to 29 CFR 1910.7.
         (d) National Voluntary Laboratory (NVLAP): Testing Agency accredited according to National Institute of Standards and Technology (NIST) Technology Administration, U. S. Department of Commerce Accreditation Program.

1.07 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Testing and inspecting services are used to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
   1. Specific quality assurance and quality control requirements for individual construction activities are specified in Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and related actions do not limit Contractor's other quality control procedures that facilitate compliance with Contract Document requirements.
   3. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

B. As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform specified testing and inspection.

C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 QUALITY ASSURANCE

A. Activities, actions, and procedures performed before and during execution of the Work to verify compliance and guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Owner or Owner's designated representative(s) will perform quality assurance to verify compliance with Contract Documents.

3.02 MOCK-UPS

A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.

B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.

C. Demonstrate proposed range of aesthetic effects and workmanship.

D. Notify Architect seven (7) working days in advance of dates and times when mock-ups will be constructed.

E. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.

F. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

G. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
   1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
   2. Make corrections as necessary until Architect's approval is issued.

H. Architect will use accepted mock-ups as a comparison standard for the remaining Work.

I. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

3.03 QUALITY CONTROL

A. Quality Control Services:
   1. Quality Control will be sole responsibility of Contractor.
      a. Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements performed by Contractor:
         1) They do not include inspections, tests or related actions performed by Architect, Owner, governing authorities or independent agencies hired by Owner or Architect.
         2) Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
      b. Where services are indicated as Contractor's responsibility, engage a qualified Testing Agency to perform these quality control services.
         1) Contractor shall not employ same testing entity engaged by Owner, without Owner’s written approval.

3.04 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

3.05 TESTING AND INSPECTION

A. See individual specification sections for testing and inspection required.

B. Activities performed by Owner's Quality Assurance Testing Agency include, but are not limited to following:
   1. Individual Sections in Division 01 through Division 49:
      a. Pre-Installation Conference agenda review items for:
         1) Schedule requirements.
         2) Testing and inspection requirements:
         3) Requirements and frequency of testing and inspections.
         4) Mock-up or sample requirements.
         5) Submittals requirements.
      b. Quality Assurance personal qualifications.
         1) Qualification documentation including certificates if required.
      c. Non-Conforming Work:
         1) Prepare non-compliance log to track non-compliant testing or inspections.
   2. Weekly Activities:
      a. Summarize and track any non-compliance issues.
      b. Provide summary report of previous week's performed Work.
      c. Visit contractors periodically to find out if they have any concerns with Quality Assurance inspectors and check on any schedule changes.
      d. Visit Owner's Representatives periodically to find out if they have any concerns with how project is progressing.

C. Testing Agency Duties:
   1. Test samples of mixes submitted by Contractor.
   2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   3. Perform specified sampling and testing of products in accordance with specified standards.
   4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
   6. Perform additional tests and inspections required by Architect.
   7. Attend preconstruction meetings and progress meetings.
   8. Submit reports of all tests/inspections specified.

D. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

E. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.

b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
c. To facilitate tests/inspections.
d. To provide storage and curing of test samples.

4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

F. Architect Duties:
1. Notify Owner's Representative before each test and/or inspection.

G. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.

H. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.06 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect 30 days in advance of required observations.
1. Observer subject to approval of Architect.
2. Observer subject to approval of Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.07 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not complying with specified requirements.

B. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
2. Comply with Contract Document requirements for Section 01 7000 - Execution and Closeout Requirements for cutting and patching.

C. Protect construction exposed by or for Quality Assurance and Quality Control activities.

D. Repair and protection are Contractor's responsibility, regardless of assignment of responsibility for Quality Assurance and Quality Control Services.

END OF SECTION

BLANK PAGE

SECTION 01 4219
REFERENCE STANDARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements relating to referenced standards.

1.02 QUALITY ASSURANCE

A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Comply with the reference standard of date of issue specified in this section, except where a specific date is established by applicable code.

C. Obtain copies of standards when required by Contract Documents.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Date of Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered by Contract Documents by mention or inference otherwise in any reference document.

G. Minimum Quantity or Quality Levels:
   1. Quantity or quality level shown or specified shall be minimum provided or performed.
   2. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits.
   3. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for context of requirements.

H. Coordination:
   1. Coordinate sequence of activities to accommodate required quality assurance and quality control services with minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

I. Scheduling:
   1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.03 INDUSTRY STANDARDS

A. Except where Contract Documents specify otherwise, construction industry standards will apply and are made a part of Contract Documents by reference.

B. Where compliance with two or more standards is specified and standards apparently establish different or conflicting requirements for minimum quantities or quality levels, refer to Architect for decision before proceeding. Quantity or quality level shown or specified will be minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.

C. Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents. Where copies of standards are needed for performance of a required construction activity, Contractor will obtain copies directly from publication source.

D. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in

Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

1.04 GOVERNING REGULATIONS

A. Governing Regulations / Authorities:
   1. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
   2. Obtain copies of regulations required to be retained at Project Site, available for reference by parties who have a reasonable need for such reference.

1.05 ABMA -- AMERICAN BEARING MANUFACTURERS ASSOCIATION, INC.

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings 2015 (Reaffirmed 2020).

1.06 AHRI -- AIR-CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE

A. AHRI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils 2001, with Addenda (2011).

B. AHRI 430 (I-P) - Performance Rating of Central Station Air-handling Unit Supply Fans 2020.

C. AHRI 610 (I-P) - Standard for Performance Rating of Central System Humidifiers for Residential Applications 2014.

D. AHRI 851 (SI) - Performance Rating of Commercial and Industrial Air Filter Equipment 2013.

1.07 AISC -- AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

1.08 AITC -- AMERICAN INSTITUTE OF TIMBER CONSTRUCTION

1.09 ALI -- AMERICAN LADDER INSTITUTE

A. ALI A14.3 - Ladders - Fixed - Safety Requirements 2008.

1.10 AMCA -- AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL, INC.

A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program 2015.

B. AMCA 99 - Standards Handbook 2016.

C. AMCA 204 - Balance Quality and Vibration Levels for Fans 2020.

D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating 2016.

E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans 2014.

F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data 2014.

G. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating 2018.

H. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating 2012 (Reapproved 2015).

1.11 ASHRAE -- AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.

A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size 2017, with Addendum (2022).

B. ASHRAE Std 62.1 - Ventilation for Acceptable Indoor Air Quality Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. ASHRAE Std 103 - Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers 2022.

1.12 ASSE -- AMERICAN SOCIETY OF SANITARY ENGINEERING

1.13 ASTM A SERIES -- ASTM INTERNATIONAL

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.

1.14 ASTM B SERIES -- ASTM INTERNATIONAL

A. ASTM B177/B177M - Standard Guide for Engineering Chromium Electroplating 2011 (Reapproved 2021).

B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.

1.15 ASTM C SERIES -- ASTM INTERNATIONAL

A. ASTM C1184 - Standard Specification for Structural Silicone Sealants 2018, with Editorial Revision.

1.16 ASTM D SERIES -- ASTM INTERNATIONAL

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2019.

B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2022.

C. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.

D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.

1.17 ASTM E SERIES -- ASTM INTERNATIONAL

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.

B. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies 2018.

C. ASTM E2486/E2486M - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS) 2022.

1.18 ASTM G SERIES -- ASTM INTERNATIONAL

A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).

1.19 AWI/AWMAC/WI -- JOINT PUBLICATION OF ARCHITECTURAL WOODWORK INSTITUTE/ARCHITECTURAL WOODWORK MANUFACTURERS ASSOCIATION OF CANADA/WOODWORK INSTITUTE

1.20 BIA -- BRICK INDUSTRY ASSOCIATION

1.21 HPVA -- HARDWOOD PLYWOOD VENEER ASSOCIATION

1.22 ICC-ES -- ICC EVALUATION SERVICE, INC.

A. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies 2009, with Editorial Revision (2012).

1.23 ISO -- INTERNATIONAL STANDARDS ORGANIZATION

1.24 MFMA -- MAPLE FLOORING MANUFACTURERS ASSOCIATION

1.25 MFMA -- METAL FRAMING MANUFACTURERS ASSOCIATION

A. MFMA-4 - Metal Framing Standards Publication 2004.

1.26 MPI -- MASTER PAINTERS INSTITUTE (MASTER PAINTERS AND DECORATORS ASSOCIATION)

A. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.

B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

1.27 MSS -- MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY, INC.

A. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).

1.28 NAAMM -- THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS

A. NAAMM AMP 510 - Metal Stairs Manual 1992.

1.29 NEMA -- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

A. NEMA MG 1 - Motors and Generators 2021.

1.30 NFPA -- NATIONAL FIRE PROTECTION ASSOCIATION

A. NFPA 54 - National Fuel Gas Code 2021.

B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2021.

D. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems 2021.

E. NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances 2019.

F. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2019.

1.31 NSF -- NSF INTERNATIONAL (THE PUBLIC HEALTH AND SAFETY ORGANIZATION)

1.32 RCSC -- RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS

1.33 RIS -- REDWOOD INSPECTION SERVICE

1.34 SMACNA -- SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION, INC.

A. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2021.

1.35 TMS -- THE MASONRY SOCIETY

1.36 TPI -- TRUSS PLATE INSTITUTE

1.37 UL -- UNDERWRITERS LABORATORIES INC.

A. UL (DIR) - Online Certifications Directory Current Edition.

B. UL 705 - Power Ventilators Current Edition, Including All Revisions.

C. UL 900 - Standard for Air Filter Units Current Edition, Including All Revisions.

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

1.02 SUBMITTALS

A. As indicated in technical sections in accordance with Section 01 3000.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by Contract Documents.

B. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and for intended use and effect.

C. Provide interchangeable components of the same manufacturer for components being replaced.

D. Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on surfaces of products that will be exposed to view in occupied spaces or on building exterior.

1. Locate required product labels and stamps on concealed surface or, where required for observation after installation, on accessible surface that is not conspicuous.
2. Provide permanent nameplates on items of service-connected or power-operated equipment. Locate on easily accessible surface that is inconspicuous in occupied spaces. Nameplate will contain following information and other essential operating data:
   a. Name of product and manufacturer.
   b. Model and serial number.
   c. Capacity.
   d. Speed.
   e. Ratings.

2.03 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by manufacturer for application described. General overall performance of product is implied where product is specified for specific application. Manufacturer's recommendations may be contained in published product literature, or by manufacturer's certification of performance.

C. Where specifications only require compliance with an imposed code, standard, or regulation, select product that complies with standards, codes or regulations specified.

D. Where Specifications require matching an established Sample, Architect's decision will be final on whether proposed product matches satisfactorily. Where no product available within specified category matches satisfactorily nor complies with other specified requirements, refer to Architect.

E. Where specified product requirements include phrase "...as selected from manufacturer's standard colors, patterns, textures..." or similar phrase, select product and manufacturer that comply with other specified requirements. Architect will select color, pattern, and texture from product line selected.

F. Remove and replace products and materials not specified in Contract Documents but installed in the Work with specified products and materials at no additional cost to Owner and for no increase in Contract time.

G. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

H. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

A. Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include:
   1. Substitutions and Equal Products:
      a. Substitutions for specified products and systems, as defined in the Uniform Commercial Code, are not acceptable. However, equal products may be approved upon compliance with Contract Document requirements.
      b. Approved Products / Manufacturers / Suppliers / Distributors / Fabricators / Installers:
   2. Acceptable Products / Manufacturers / Suppliers / Installers:
      a. Use ‘Equal Product Approval Request Form’ to request approval of equal products, manufacturers, or suppliers before bidding or before installation, as noted in individual Sections.
   3. Quality / Performance Standard Products / Manufacturers:
      a. Products / manufacturers used shall conform to Contract Document requirements.
   4. Comparable Product Requests:
      a. Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles:
         1) Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
         2) Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
            (a) Form of Approval: As specified in Division 01 Section "Submittal Procedures."
            (b) Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
         3) Submit five copies of each required submittal unless otherwise required. Architect will return three copies marked with action taken and with corrections or modifications required.

4) Submit electronic files: PDF. Architect will return a PDF copy marked with action taken and with corrections or modifications required.

3.02 TRANSPORTATION AND HANDLING

A. Package products for shipment in manner to prevent damage or theft; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Schedule delivery to reduce long-term storage at site and to prevent overcrowding of construction spaces.

E. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

F. Transport and handle products in accordance with manufacturer's instructions.

G. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

H. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

I. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

J. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

A. Provide protection of stored materials and products against theft, casualty, or deterioration.

B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.

C. Store and protect products in accordance with manufacturers' instructions.

D. Store with seals and labels intact and legible.

E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities, amounts, and unit counts. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.

G. Store heavy materials away from Project structure so supporting construction will not be endangered.

H. For exterior storage of fabricated products, place on sloped supports above ground.

I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

J. Comply with manufacturer's warranty conditions, if any.

K. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

L. Prevent contact with material that may cause corrosion, discoloration, or staining.

M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

3.04 NON-CONFORMING WORK

A. Non-conforming work as covered in General Conditions applies, but is not limited, to use of non-specified products or manufacturers.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Surveying for laying out the work.

C. Cleaning and protection.

D. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

A. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

1.03 QUALIFICATIONS

A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.04 PROJECT CONDITIONS

A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

D. Perform dewatering activities, as required, for the duration of the project.

E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

F. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
   1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
   2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.

G. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   1. Minimize amount of bare soil exposed at one time.
   2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

H. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
   1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
   2. Outdoors: Limit conduct of especially noisy exterior work to 7:00am to 9:00pm.
   3. Indoors: Limit conduct of especially noisy interior work to 7:00am to 9:00pm .

I. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
   1. Pest Control Service: [N/A] treatments.

J. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

K. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents. Notify Architect of conflicts between Manufacturer's installation instructions and Contract Document requirements.

B. Provide attachment and connection devices and methods necessary for securing Work. Secure work true to line and level. Anchor each product securely in place, accurately located, and aligned with other Work. Allow for expansion and building movement.

C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

F. Visual Effects: Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain best visual effect. Refer questionable choices to Architect for final decision.

G. Install each component during weather conditions and Project status that will ensure best possible results. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.

H. Coordinate temporary enclosures with required inspections and tests, to reduce necessity of uncovering completed construction for that purpose.

I. Mounting Heights: Where mounting heights are not shown, install individual components at standard mounting heights recognized within the industry or local codes for that application. Refer questionable mounting height decisions to Architect for final decision.

3.05 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-complying work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

I. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.06 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Keep site and adjoining streets reasonably clean. If necessary, sprinkle rubbish and debris with water to suppress dust.

E. During handling and installation, protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from soiling, damage, or deterioration until Substantial Completion.

F. Clean and maintain completed construction as frequently as necessary throughout construction period. Adjust and lubricate operable components to ensure ability to operate without damaging effects.

G. Organ Chamber:
   1. Clean debris from inside Organ Chamber and leave dust free before organ speakers are installed.

H. Supervise construction activities to ensure that no part of construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

I. Before and during application of painting materials, clear area where such work is in progress of debris, rubbish, and building materials that may cause dust. Sweep floors and vacuum as required and take all possible steps to keep area dust free.

J. Clean exposed surfaces and protect as necessary to avoid damage and deterioration.

K. Place extra materials of value remaining after completion of associated work have become Owner's property as directed by Owner or Architect.

L. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.08 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.09 FINAL CLEANING

A. Execute final cleaning after Substantial Completion but before making final application for payment.
   1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.

B. Use cleaning materials that are nonhazardous.

C. Comply with individual manufacturer's cleaning instructions.

D. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

E. Clean each surface or unit to condition expected in normal, commercial building cleaning and maintenance program, including but not limited to:
   1. Interior Cleaning:
      a. Exercising care not to scratch glass.
      b. Remove marks, stains, fingerprints and dirt.
      c. Clean and polish woodwork and finish hardware.
      d. Clean plumbing fixtures and tile work. Remove spots, soil or paint.
      e. Clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
      f. Clean other fixtures and equipment and remove stains, paint, dirt, and dust.
      g. Remove temporary floor protection and clean floors.
   2. Exterior Cleaning:
      a. Exercising care not to scratch glass.
      b. Remove marks, stains, and dirt from exterior surfaces.
      c. Clean and polish finish hardware.
      d. Remove temporary protection systems.
      e. Clean dirt, mud, and other foreign material from paving and sidewalks.
      f. Clean drop inlets, through-curb drains, and other drainage structures.
      g. Remove trash, debris, and foreign material from landscaped areas.

F. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

G. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

H. Clean filters of operating equipment.

I. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.

J. Clean site; sweep paved areas, rake clean landscaped surfaces.

K. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.10 CLOSEOUT PROCEDURES

A. Closeout process consists of three specific project closeout inspections. Contractor shall plan sufficient time in construction schedule to allow for required inspections before expiration of Contract Time.

B. Contractor shall conduct his own inspections of The Work and shall not request closeout inspections until The Work of the contract is reasonably complete and correction of obvious defects or omissions are complete or imminent.

C. Date of Substantial Completion shall not occur until completion of construction work, unless agreed to by Architect and included on Certificate of Substantial Completion.

D. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect and Owner.

E. Preliminary Closeout Review:
   1. When Architect, Owner and Contractor agree that project is ready for closeout, Pre-Substantial Inspection shall be scheduled. Preparation of floor substrate to receive carpeting and any work which could conceivably damage or stain carpet must be completed, as carpet installation will be scheduled immediately following this inspection.
   2. Prior to this inspection, completed test and evaluation reports for HVAC system and font, where one occurs, are to be provided to Project Manager, Architect, and applicable consultants.
   3. Architect and his appropriate consultants, together with Contractor and mechanical, plumbing, fire protection, and electrical sub-contractors shall conduct a space by space and exterior inspection to review materials and workmanship and to demonstrate that systems and equipment are operational.
      a. Punch list of items requiring completion and correction will be created.
      b. Time frame for completion of punch list items will be established, and date for Substantial Completion Inspection shall be set.

F. Substantial Completion Inspection:
   1. When Architect, Owner and Contractor agree that project is ready for Substantial Completion, an inspection is held. Punch list created at Pre-Substantial Inspection is to be substantially complete.
   2. Prior to this inspection, Contractor shall discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups and similar elements.
   3. Architect, Owner and Contractor review completion of punch list items. When Owner and Architect confirm that Contractor has achieved Substantial Completion of The Work, Owner, Architect and Contractor will execute Certificate of Substantial Completion that contains:
      a. Date of Substantial Completion.
      b. Punch List Work not yet completed, including seasonal and long lead items.
      c. Amount to be withheld for completion of Punch List Work.
      d. Time period for completion of Punch List Work.
      e. Amount of liquidated damages set forth in Supplementary Conditions to be assessed if Contractor fails to complete Punch List Work within time set forth in Certificate.
   4. Contractor shall present Closeout Submittals to Architect and place tools, spare parts, extra stock, and similar items required by Contract Documents in locations as directed by Facilities Manager.

G. Final Acceptance Meeting:
   1. When punch list items except for any seasonal items or long lead items which will not prohibit occupancy are completed, Final Acceptance Meeting is held.

2. Owner, Architect and Contractor execute Owner's Project Closeout - Final Acceptance form, and verify:
   a. All seasonal and long lead items not prohibiting occupancy, if any, are identified, with committed to completion date and amount to be withheld until completion.
   b. Owner's maintenance personnel have been instructed on all system operation and maintenance as required by the Contract Documents.
   c. Final cleaning requirements have been completed.
3. If applicable, once any seasonal and long lead items are completed, Closeout Inspection is held where Owner and Architect verify that The Work has been satisfactorily completed, and Owner, Architect and Contractor execute Closeout portion of the Project Closeout - Final Acceptance form.
4. When Owner and Architect confirm that The Work is satisfactorily completed, Architect will authorize final payment.

3.11 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

BLANK PAGE

SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

D. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 DEFINITIONS

A. Asphalt Pavement, Brick, and Concrete (ABC) Rubble: Rubble that contains only weathered (cured) asphalt pavement, clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waste or debris.

B. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

C. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

D. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

E. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

F. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

1.03 SUBMITTALS

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

PART 3 EXECUTION

2.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

B. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Prebid meeting.
   2. Preconstruction meeting.
   3. Regular job-site meetings.

C. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

D. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

E. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project record documents.

B. Operation and maintenance data.

C. Warranties and bonds.

D. Maintenance materials.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Individual Product Sections: Specific requirements for operation and maintenance data.

C. Individual Product Sections: Warranties required for specific products or Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Do not use record documents for construction purposes:
   1. Protect from deterioration and loss in secure, fire-resistive location.
   2. Provide access to record documents for Architect's reference during normal working hours.

B. Maintain clean, undamaged set of Drawings:
   1. Mark set to show actual installation where installation varies from the Work as originally shown.
   2. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
   3. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
   4. Mark new information that is important to Owner, but was not shown on Drawings.
   5. Note related Change Order numbers where applicable.

C. As Built Record Drawings:
   1. As required in agreement with the Owner:
      a. Architect will provide two full-size sets of prints of the As Built Record Drawings to the Facilities Management Office, printed from the updated AutoCAD drawing files or updated Revit model files, as specified by Owner, that have been modified to show actual dimensions and location of equipment, material, utility lines, and other work as actually constructed, based upon information provided by Contractor. Architect will submit updated As Built Record Drawings in PDF (ISO32000 format) to Owner.
      b. Architect will submit following:
         1) Updated AutoCAD as built record drawing files with associated plot style tables or Revit as built record model files, as specified by Owner.
         2) Revit Model O&M lifecycle requirements to be tracked by Facility Manager.

D. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

E. Ensure entries are complete and accurate, enabling future reference by Owner.

F. Store record documents separate from documents used for construction.

G. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

3.02 OPERATION AND MAINTENANCE DATA

A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

E. General:
   1. Include closeout submittal documentation as required by Contract Documentation.
   2. Include workmanship bonds, final certifications, equipment check-out sheets, and similar documents.
   3. Releases enabling Owner unrestricted use of The Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
   4. Include Project photographs, damage or settlement survey, and similar record information required by Contract Documents.
   5. Submittal Format:
      a. Digital copies unless otherwise noted, required for each individual specification section that include ‘Closeout Submittals’.
      b. Include only closeout submittals as defined in individual specification section as required in Contract Documents.

F. Project Manual:
   1. Copy of complete Project Manual including Addenda, Modifications as defined in General Conditions, and other interpretations issued during construction:
      a. Mark these documents to show variations in actual Work performed in comparison with text of specifications and Modifications.
      b. Show substitutions, selection of options, and similar information, particularly on elements that are concealed or cannot otherwise be readily discerned later by direct observation.

G. Maintenance Contracts:
   1. Digital format only.

H. Operations and Maintenance Data:
   1. Digital format only:
      a. Cleaning instructions.
      b. Maintenance instructions.
      c. Operations instructions.
      d. Equipment list.
      e. Parts list.

I. Warranty Documentation:
   1. Digital format of final, executed warranties.

J. Record Documentation:

1. Digital format only.
    a. Certificate of Occupancy
    b. Certifications.
    c. Color and pattern selections
    d. Design Data.
    e. Geotechnical Evaluation Reports (soils reports).
    f. Manufacture Reports.
    g. Manufacturer's literature or cut sheets.
    h. Shop Drawings.
    i. Source Quality Control.
    j. Special Procedures.

K. Testing and Inspection Agency Reports.
    1. Testing and Inspection Reports.

L. Software:
    1. Audio and Video System software, programming and set-files.

M. Irrigation Plan.
    1. Laminated and un-laminated reduced sized hard copies.

N. Landscape Management Plan (LMP):
    1. Irrigation Section:
        a. Submittal Format: Digital format and hard copy of each.
        b. Documentation required by sections under 32 8000 Heading: ‘Irrigation’.
    2. Landscaping Section:
        a. Submittal Format: Digital format and hard copy of each.
        b. Documentation required by sections under 32 9000 Heading: ‘Planting’.

3.03 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Include originals of each in operation and maintenance manuals, indexed separately on Table of Contents.

F. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers. Provide copy of electronic manual as requested by owner.

G. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

H. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

I. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.04 MAINTENANCE MATERIAL SUBMITTALS

A. Submit item(s) required by Section 01 3000 - Administrative Requirements and as defined in individual specification sections if required in Contract Documents. Items may be provided at completion of Work or with Closeout Submittals.

END OF SECTION

SECTION 02 4113
SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

A. Includes But Not Limited To:
   1. Demolish and remove portions of existing site facilities as described in Contract Documents.

B. Related Requirements:
   1. New and replacement work specified in appropriate specification Sections.

1.02 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
   1. Include on Construction Schedule specified in Section 01 3200 detailed sequence of individual site demolition operations.

1.03 SUBMITTALS

A. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Identify abandoned utility and service lines and capping locations on record drawings.

PART 2 PRODUCTS: NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

3.02 PREPARATION

A. Notify corporations, companies, individuals, and local authorities owning conduits running to property.
   1. Protect and maintain conduits, drains, sewers, pipes, and wires that are to remain on the property.
   2. Arrange for removal of wires running to and on property. Remove pipes and sewers in accordance with instructions of above owners.

3.03 PERFORMANCE

A. Execute work in orderly and careful manner, with due consideration for neighbors and the public.

B. Carefully remove, disassemble, or dismantle as required, and store in approved location on site, existing items to be reused in completed work. Coordinate with Owner for equipment and materials to be removed by Owner.

C. Concrete And Paving Removal:
   1. Saw cut joints between material to be removed and material to remain to full depth.
   2. Hand-excavate trench 12 inches (300 mm) wide and 16 inches (400 mm) deep along concrete or paving to be removed. Cut roots encountered with saw, axe, or pruner. Do not cut roots with excavating equipment. Remove roots under concrete and paving to be replaced down to 12 inches (300 mm) below finish grade.

3.04 CLEANING

A. Keep streets and roads reasonably clean, and sweep daily.

B. Sprinkle demolition rubbish and debris as necessary to lay dust.

C. Promptly remove demolition materials, rubbish, and debris from property.

END OF SECTION 02 4113

BLANK PAGE

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Concrete anchors

C. Concrete foundation walls.

D. Concrete reinforcement.

E. Joint devices associated with concrete work.

F. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrust blocks, and manholes.

G. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 03 3517 - Concrete Sealer Finishing

B. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).

B. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide 2022.

C. ACI 301 - Specifications for Concrete Construction 2020.

D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).

F. ACI 305R - Guide to Hot Weather Concreting 2020.

G. ACI 306R - Guide to Cold Weather Concreting 2016.

H. ACI 308R - Guide to External Curing of Concrete 2016.

I. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).

J. ACI 347R - Guide to Formwork for Concrete 2014 (Reapproved 2021).

K. ANSI/NFSI B101.1 - Test Method For Measuring Wet SCOF Of Common Hard-Surface Floor Materials 2009.

L. ANSI/NFSI B101.3 - Test Method For Measuring Wet DCOF Of Common Hard-Surface Floor Materials 2012.

M. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished 2018.

N. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.

O. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2021a.

P. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.

Q. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars 2022.

R. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement 2014.

S. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.

T. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation 2017.

U. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.

V. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.

W. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022a.

X. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.

Y. ASTM C150/C150M - Standard Specification for Portland Cement 2022.

Z. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2020.

AA. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.

BB. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.

CC. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2022.

DD. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing 2017.

EE. ASTM C779/C779M - Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces 2019.

FF. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures 2016.

GG. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2021.

HH. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2020.

II. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2020.

JJ. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete 2019.

KK. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.

LL. ASTM D471 - Standard Test Method for Rubber Property--Effect of Liquids 2016a (Reapproved 2021).

MM. ASTM D523 - Standard Test Method for Specular Gloss 2014 (Reapproved 2018).

NN. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type) 2011 (Reapproved 2022).

OO. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

PP. ASTM D1752 - Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2018.

QQ. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting 2015.

RR. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars 2021.

SS. ASTM D5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image (DOI) Gloss of Coated Surfaces 2018.

TT. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a.

UU. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a (Reapproved 2019).

VV. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers 2020.

WW. ASTM E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers (Metric) 2014.

XX. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.

YY. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs 2017.

ZZ. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection 2021.

AAA. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength 2020.

BBB. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.

CCC. COE CRD-C 48 - Handbook for Concrete and Cement Standard Test Method for Water Permeability of Concrete 1992.

DDD. COE CRD-C 513 - Handbook for Concrete and Cement Corps of Engineers Specifications for Rubber Waterstops 1974.

EEE. COE CRD-C 572 - Handbook for Concrete and Cement Corps of Engineers Specifications for Polyvinylchloride Waterstop 1974.

FFF. COE CRD-C 621 - Handbook for Concrete and Cement Standard Specification for Packaged, Dry 1997.

GGG. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2015.

HHH. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2016.

III. ICC-ES AC380 - Acceptance Criteria for Termite Physical Barrier Systems 2014, with Editorial Revision (2017).

JJJ. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.

KKK. NSF 61 - Drinking Water System Components - Health Effects 2022, with Errata.

LLL. NSF 372 - Drinking Water System Components - Lead Content 2022.

1.04 SUBMITTALS

A. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
   1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
   2. For chemical-resistant waterstops, provide data on ASTM D471 test results.
   3. Printed application instructions for form release agents.

B. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

C. Shop Drawings:
   1. Show dimensioned locations of anchor bolts for hold-down anchors and columns.
   2. Show reinforcement and all necessary bending diagrams and reinforcing steel list, and construction joint locations.
   3. Provide bar schedules and bending details.
   4. Show all formwork for concrete surfaces which are to remain exposed in the finished work.
   5. Joint layout plan for control and expansion joints for sidewalks, curbs, and gutters for written approval before starting work on this Section.

D. Samples: Submit samples of underslab vapor retarder to be used.

E. Ready-Mix Supplier:
   1. Require mix plant to furnish delivery ticket for each batch of concrete. Keep delivery tickets at job-site for use of Owner or its representatives. Tickets shall show following:
      a. Name of ready-mix batch plant.
      b. Serial number of ticket.
      c. Date and truck number.
      d. Name of Contractor.
      e. Name and location of Project.
      f. Specific class or designation of concrete conforming to that used in Contract Documents.
      g. Amount of concrete.
      h. Amount and type of cement.
      i. Total water content allowed by mix design.
      j. Amount of water added at plant.
      k. Sizes and weights of sand and aggregate.
      l. Time loaded.
      m. Type, name, manufacturer, and amount of admixtures used.
   2. Provide certificates with supporting testing reports verifying compliance with Contract Document requirements and that materials provided are from single source for following:
      a. Cement.
      b. Aggregate.
      c. Fly Ash.

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

G. Test Reports: Submit termite-resistant sheet manufacturer's summary of independent laboratory and field testing for effectiveness in subterranean termite exclusion.

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

I. Manufacturer’s Reports:
   1. Provide Manufacturer's performance and testing data for following:
      a. Each admixture used.

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

K. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Pour Reports:
            (a) Provide report that records following information:
               (1) Date and time of start of pour, Date and time of end of pour, and Date and time of end of finishing procedures.
               (2) Temperature at start of pour, Temperature at end of Pour, and Maximum temperature during performance of finishing procedures.

(3) Wind speed at start of pour, Wind speed at end of pour, and Maximum wind speed during performance of finishing procedures.
(4) Humidity at start of pour, Humidity at end of pour, and High and low humidity during performance of finishing procedures.
(5) Cloud cover at start of pour, Cloud cover at end of pour, and High and low cloud cover during performance of finishing procedures.
(6) Screeding method and equipment used.
(7) Saw cut method and equipment used.

2) Testing and Inspection Reports:
(a) Testing Agency Testing and Inspecting Reports of concrete.

3) Warranty. Submit rapid concrete drying or MVRA manufacturer warranties for concrete moisture vapor emission induced flooring failure and adhesion; ensure both have been completed in project's name and registered with manufacturer.
(a) Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of concrete. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
(b) Provide stand-alone adhesion warranty matching duration of flooring adhesive or primer manufacturer's material defect warranty.

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

1.05 DEFINITIONS

A. Cold Weather, as referred to in this Section, is four (4) hours with ambient temperature below 40 deg F in twenty-four (24) hour period.

B. Floor Flatness (FF): Rate of change in elevation of floor over 12 inches section.

C. Floor Levelness (FL): Measures difference in elevation between two points which are 10 feet apart.

D. Hot Weather, as referred to in this Section, is ambient air temperature above 100 deg F or ambient air temperature above 90 deg F with wind velocity 8 mph or greater.

1.06 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.
1. Maintain one copy of each document on site.

B. Qualifications: Requirements of Section 01 4000 applies, but is not limited to following:
1. Installers and Installation Supervisor:
a. ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
b. Certification for National Ready Mixed Concrete Association (NRMCA).
2. Ready-Mix Supplier:
a. Comply with ASTM C94/C94M requirements and be certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities".
3. Testing Agencies:
a. Independent agency qualified according to ASTM C1077 and ASTM E329.
1) Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technicians, Grade I according to ACI CP-1 or equivalent certification program.
2) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be ACI-certified Concrete Laboratory Testing Technician - Grade II.

C. Testing and Inspection:
1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.

2. Owner will provide Testing and Inspection on concrete:
    a. Owner will employ testing agencies to perform testing and inspection on concrete as specified in Field Quality Control in Part 3 of this specification:
        1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.

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

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

F. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

G. MANDATORY Pre-Installation Conference:
1. Agenda items, review following:
    a. Review Section 01 4000 for Testing and Inspection administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
        1) Review requirements and frequency of testing and inspections.
    b. Set up concrete placement pour card system and verify that all relevant trades have signed off prior to concrete placement.
    c. Obtaining trade sign-offs on each pour card will be responsibility of General Contactor's foreman or whoever is in charge of ordering concrete.
    d. Pour cards will be turned in to Quality Assurance representative after the work has been completed so that they can be reviewed and filed.
    e. Review installation scheduling, coordination, placement of building concrete, and placement of items installed in and under concrete.
    f. Review installation scheduling, coordination and placement of site concrete and of items installed in concrete.
    g. Review "Verification of Conditions" requirements.
    h. Review requirements for preparation of subgrade and aggregate base requirements.
    i. Review formwork requirements.
    j. Review approved mix design requirements, mix designs and use of admixtures.
    k. Review reinforcing bar submittals.
    l. Review installation schedule and placement of reinforcing bars.
    m. Review placement, finishing, and curing of concrete, including cold and hot weather requirements.
    n. Review joint layout plan for control and expansion joints, fillers for sidewalks, curbs, and gutters:
        1) Review jointing requirements.
        2) Joint layout for concrete paving is specified in Section 32 1313.
    o. Review smooth rubbed concrete finish procedures and requirements (applied immediately after removing concrete formwork while concrete is "green").
    p. Review layout plan, scheduling, coordination, and placement requirements of detectable warning panels.
    q. Review concrete slab tolerances and corrective measures if tolerances not met.
    r. Review safety issues.

H. Scheduling:
1. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete.
2. Schedule pre-installation conference prior to placing of footings, installation of foundation forms and reinforcing steel, and installation of anchors, dowels, inserts, and block outs in foundation walls and slabs.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Slabs with Porosity Inhibiting Admixture (PIA) or Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.
   1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.

C. Moisture Emission-Reducing Curing and Sealing Compound, Membrane-Forming: Provide warranty to cover cost of flooring delamination failures for 10 years.
   1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

D. Moisture Emission-Reducing Curing and Sealing Compound, Penetrating: Provide non-prorated warranty to cover cost of flooring delamination failures for 20 years.
   1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

E. Termite-Resistant Vapor Barrier Sheet: Provide five year manufacturer's limited warranty.

PART 2 PRODUCTS

2.01 CONCRETE FORMWORK

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

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
   2. Form Facing for Exposed Finish Concrete: Steel.
   3. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
      a. Vertical earth cuts may be used for footings provided the footing width and length are 6" wider and longer than scheduled.
   4. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   5. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 CONCRETE ANCHORS

A. General:
   1. Use hot-dipped galvanized or stainless steel with matching nuts and washers in exterior and moist interior applications unless indicated otherwise on Contract Drawings.
      a. Install hot-dipped or stainless steel anchor bolts to attach wood sill plates to foundation with 1/4 inch by 3 inch x 3 inch minimum adjustable plate washers and standard cut washers between wood sill plates and nuts.
      b. Nut: Conform to requirements of ASTM A563, Grade A, Hex.
      c. Conform to requirements of ASTM F3125/F3125M for chemical, physical and mechanical requirements for quenched and tempered bolts manufactured from steel and alloy steel.
   2. Threaded rod for adhesive anchors and cast-in anchors:
      a. Conform to requirements of ASTM A307, Grade A or ASTM F1554 Grade 36 unless indicated otherwise on Contract Drawings.
   3. Cast-In-Place Anchor Bolts:
      a. J-Bolts:

1) Non-headed type threaded 2 inches minimum conforming to requirements of ASTM F1554, Grade A.
2) Anchor hook to project 2 inches minimum including bolt diameter.

b. Headed Bolts:
1) Headed type threaded 2 inches minimum conforming to requirements of ASTM F1554, Grade A.

4. Headed Concrete Anchor Studs:
a. Composed of low carbon steel meeting requirements of ASTM A108.
b. Tensile Strength: 61,000 psi minimum.
c. Yield Strength: 49,000 psi minimum.

5. Deformed Bar Anchors:
a. Manufactured in accordance with requirements of ASTM A1064/A1064M.
b. Tensile Strength: 80,000 psi minimum.
c. Yield Strength: 70,000 psi minimum.

6. Reinforcing Bars:
a. Composed of deformed carbon steel meeting requirements of ASTM A615/A615M, Grade 60 (field bent bars may be Grade 40)

7. Adhesive Anchors:
a. Products shall have current ESR conforming to current ICC Acceptance Criteria ICC-ES AC308 for concrete.
b. Rod diameter and embedment length as indicated on Contract Drawings.
c. Acceptable Products:
1) HIT-RE 500V3 with SafeSet Epoxy Adhesive by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Pure 110+ by Powers Fasteners Inc., Brewster NY www.powers.com.
3) SET-XP Epoxy by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
4) Equal as approved by Architect before installation. See Section 01 6000.

8. Expansion Anchors:
a. Products shall have current ESR conforming to current ICC Acceptance Criteria ICC-ES AC193 for concrete.
b. Acceptable Products:
1) KWIK Bolt TZ Expansion Anchor by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Power-Stud +SD2 by Powers Fasteners Inc., Brewster NY www.powers.com.
3) Strong-Bolt by Simpson Strong-Tie Co., Pleasanton, CA www.simpsonanchors.com.
4) Equal as approved by Architect before installation. See Section 01 6000.

9. Screw Anchors:
a. Provide anchors with length identification markings conforming to ICC Acceptance Criteria ICC-ES AC193 for concrete.
b. Type Two Acceptable Products:
1) KWIK HUS-EZ by Hilti Fastening Systems, Tulsa, OK www.us.hilti.com.
2) Wedge-Bolt+ by Powers Fasteners Inc., Brewster NY www.powers.com.
3) Titen HD by Simpson Strong Tie Co, Pleasanton, CA www.simpsonanchors.com.
4) Equals as approved by Architect through shop drawing submittal before installation. See Section 01 6000.

2.03 REINFORCEMENT MATERIALS

A. Epoxy Coated Reinforcement Steel Bars:
1. Bars shall have grade identification marks and conform to ASTM A615/A615M with coating conforming to ASTM A775/A775M and comply with requirements of ACI 318.21.2.5:

a. Bar supports shall be completely coated with epoxy or vinyl, compatible with both concrete and epoxy coating on bars. Coating shall be at least 1/8 inch thick at tips.
b. Tie wire shall be nylon coated.

2. Actual yield strength based on mill tests does not exceed specified yield strength by more than 18,000 psi and Ratio of actual ultimate stress (at breaking point) to actual tensile yield stress shall not be less than 1.25.
a. Grade 60 minimum, except dowels that are to be field bent, Grade 40 minimum.

3. Bars shall be deformed type.
4. Bars shall be free of heavy rust scales and flakes, or other bond-reducing coatings.

B. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
2. Bar Supports:
a. Concrete masonry units or bricks are not acceptable.
b. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CSRI, Class 2).
c. Acceptable Products:
1) Concrete 'dobies' or blocks wired to reinforcing.
2) Manufactured chairs with 4 sq inch bearing surface on sub-grade, or other feature to prevent chair from being pushed into sub-grade or damaging vapor retarder under slabs on grade.

3. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
4. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.04 CONCRETE MATERIALS

A. Performance:
1. Design Criteria: Conform to requirements of ASTM C94/C94M unless specified otherwise:
2. Capacities:
a. For testing purposes, following concrete strengths are required:
1) At 7 days: 70 percent minimum of 28 day strengths.
2) At 28 days: 100 percent minimum of 28 day strengths.

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

C. Concrete mix design: Submit mix designs to meet following requirements:
1. Mix Type A:
a. For exterior concrete exposed to freeze/thaw cycles and deicing salts or where soils are "corrosive" and as otherwise required by the contract drawings.
b. 4500 psi (31.03 MPa) minimum at twenty-eight (28) days.
c. Water / Cementitious Material: 0.40 maximum by weight.
d. Use twenty-five (25) percent Class F fly ash as part of cementitious material.
e. Mix Type E should be used for all exterior concrete exposed to freeze/thaw cycles and deicing salts, unless dictated otherwise by site conditions.
f. For concrete paving, use mix design based upon use of 1-1/2 inches coarse aggregate (about 15 percent).

2. Air Entrainment: Six (6) percent, plus or minus 1-1/2 percent for exterior concrete and foundation walls exposed to freeze/thaw cycles.
3. Do not add water any time during mixing cycle above amount required to meet specified water / cement ratio. No reduction in amount of cementitious material is allowed.
4. Mix design stregnths specified are a minimum due to exposure to sulfates, chlorides, freeze/thaw, water, etc. Refer to the structural drawings for additional concrete strength requirements. The most stringent requirements should be met.

D. Slump:
   1. 4 inch (100 mm) slump maximum before addition of high range water reducer.
   2. 8 inch (200 mm) slump maximum with use of high range water reducer.
   3. Slump not required for Mix Type G.

E. General:
   1. Submit a letter on quarry's letterhead that certifies all aggregate for concrete complies with the requirements of this section. Material certificates which are submitted shall be signed by both the materials producer and the contractor, certifying that materials comply with or exceed requirements specified herein to the Architect, Civil and Structural Engineering Consultant and the Independent Testing Laboratory for review and approval.
   2. Aggregates for all concrete shall come from a quarry that is DOT approved and meets or exceeds durability Class I aggregate. The quarry shall submit a letter to Engineer that certifies that all aggregate complies with DOT requirements for durability. Aggregate not meeting DOT durability requirements shall not be used.

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

G. Fly Ash: ASTM C618, Class C or F.
   1. Not to exceed twenty-five (25) percent of weight of cementitious materials.

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

2.05 ADMIXTURES

A. No admixture shall contain calcium chloride nor shall calcium chloride be used as an admixture. All chemical admixtures used shall be from same manufacturer and compatible with each other.
   1. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Mix design shall show proposed admixtures, amount, usage instructions, and justification for proposed use. Do not use any admixtures without Architect's written approval.
   1. Chemical accelerator or retarder may be used if necessary to meet environmental conditions and construction schedules.

C. Alkali-Silica Reactivity Inhibiting Admixture:
   1. Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

D. Viscosity Modifying Admixture (VMA):
   1. Liquid admixture used to optimize viscosity of Self-Consolidating Concrete (SCC). Subject to compliance with requirements, provide following at dosage rates per manufacturer's recommendations.
   2. Manufacturer: As approved by Architect before use. See Section 01 6000.

E. Air Entraining Admixture: ASTM C260/C260M.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

F. High Range Water Reducing Admixture: ASTM C494/C494 Type F.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

G. High Range Water Reducing and Retarding Admixture (Superplasticizer): ASTM C494/C494M Type G.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

H. Water Reducing Admixture: ASTM C494/C494M Type A.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

I. Water Reducing and Accelerating Admixture: ASTM C494/C494 Type E.
   1. Manufacturer: As approved by Architect before use. See Section 01 6000.

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

1. Manufacturer: As approved by Architect before use. See Section 01 6000.

K. Accelerating Admixture: ASTM C494/C494M Type C.
1. Manufacturer: As approved by Architect before use. See Section 01 6000.

L. Retarding Admixture: ASTM C494/C494M Type B.
1. Manufacturer: As approved by Architect before use. See Section 01 6000.

M. Shrinkage Reducing Admixture: ASTM C494/C494M Type S.
1. Manufacturer: As approved by Architect before use. See Section 01 6000.

N. Non-Chloride, Non-Corrosive Accelerating Admixture: ASTM C494/C494M Type C or E.
1. Manufacturer: As approved by Architect before use. See Section 01 6000.

O. Corrosion Inhibiting Admixture: ASTM C494/C494M Type C and ASTM C1582/C1582M.
1. Liquid admixture to inhibit corrosion of steel reinforcement in concrete by introducing proper amount of anodic inhibitor. Admixture shall contain thirty (30) percent calcium nitrite solution and shall be used where called for in specifications or on drawings.
2. Manufacturer: As approved by Architect before use. See Section 01 6000.

P. Moisture Vapor Reduction Admixture (MVRA):
1. Liquid, inorganic admixture free of volatile organic compounds (VOCs) and formulated to close capillary systems formed during curing to reduce moisture vapor emission and transmission with no adverse effect on concrete properties or finish flooring.
2. Manufacturer: As approved by Architect before use. See Section 01 6000.

Q. Waterproofing Admixture:
1. Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties.
2. Admixture Composition: Crystalline, functioning by growth of crystals in capillary pores.
3. Admixture Composition: Hydrophobic polymer waterproofing and corrosion inhibitor, functioning by closing concrete pores and chemical bonding.
4. Permeability of Cured Concrete: No measurable leakage when tested in accordance with COE CRD-C 48 at 200 psi; provide test reports.
5. Potable Water Contact Approval: National Science Foundation (NSF) certification for use on structures holding potable water, based on testing in accordance with NSF 61 and NSF 372.
6. Manufacturer: As approved by Architect before use. See Section 01 6000.

R. Rapid Drying Admixture in Interior Concrete Slabs on Grade:
1. Admixture specifically designed to promote rapid drying of concrete.
2. Manufacturer: As approved by Architect before use. See Section 01 6000.

2.06 ACCESSORY MATERIALS

A. Underslab Vapor Retarder:
1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited.
2. Thickness: 15 mil minimum
3. Water Vapor Permeance: ASTM E96, Metah A, Perm 0.01
4. Puncture Resistance: ASTM D1709
5. Installation: Comply with ASTM E1643
6. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
7. Manufacturer: As approved by Architect before use. See Section 01 6000.

B. Termite-Resistant Vapor Barrier Sheet: Plastic sheet complying with ASTM E1745, Class C; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs, and for exclusion of subterranean termites.

1. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, prefabricated boots, etc., for sealing seams and penetrations.
2. Manufacturers: As approved by Architect before use. See Section 01 6000.

C. Termite-Excluding Underslab Barrier and Waterproofing Membrane: Composite sheet of polyethylene film, termite-excluding barrier sealant, and non-woven polypropylene fabric.
1. Total Thickness: 95 mils (0.095 inch).
2. Termite Resistance: 100 percent when tested in accordance with ICC-ES AC380.
3. Water Vapor Permeance: 0.03 perm, maximum, when tested in accordance with ASTM E96/E96M.
4. Accessory Products: Manufacturer's recommended flexible sealant tape, adhesive, mastic, etc., for sealing seams and penetrations.
5. Manufacturers: As approved by Architect before use. See Section 01 6000.

D. Termite-Resistant Barrier Sealant:
1. Solvent-based; single component, no-sag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.
2. Manufacturers: As approved by Architect before use. See Section 01 6000.

E. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. Grout: Comply with ASTM C1107/C1107M.
2. Meet following requirements:
   a. ASTM C1107/C1107M, Type B or Type C.
   b. Corps and Engineers CRD C-621.
   c. Compressive strength of 6000 psi (41 MPa) minimum.
3. Manufacturers: As approved by Architect before use. See Section 01 6000.

F. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator (use on expansion joints of interior slabs on grade of Welfare Services Projects):
1. Composition: High solids content material exhibiting positive expansion when tested in accordance with ASTM C827/C827M.
2. 100 percent solids, two-component, moisture-insensitive, semi-rigid epoxy for use as joint filler for saw cut and tooled interior joints.
3. Self leveling consistency.
4. Shore A Hardness: 75 to 80.
5. Meet following minimum criteria:
   a. Tensile Strength: 600 psi (4.2 MPa).
   b. Ultimate Elongation: 35 percent.
6. Manufacturers: As approved by Architect before use. See Section 01 6000.

G. Semi-Rigid Joint Filler (control joints of interior concrete slabs on grade in warehouse areas of Welfare Services Projects):

2.07 BONDING AND JOINTING PRODUCTS

A. Bonding Agents:
1. Manufacturers: As approved by Architect before use. See Section 01 6000.

B. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
1. Manufacturers: As approved by Architect before use. See Section 01 6000.

C. Waterstops (Contractor Option):
1. Waterstops: PVC, complying with COE CRD-C 572.
   a. Configuration: As indicated on drawings.
   b. Size: As indicated on drawings.
   c. Manufacturers: As approved by Architect before use. See Section 01 6000.
2. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.

a. Configuration: As indicated on drawings.
b. Size: As indicated on drawings.
c. Manufacturers: As approved by Architect before use. See Section 01 6000.

D. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
1. Material: ASTM D1751, cellulose fiber.
2. Manufacturers: As approved by Architect before use. See Section 01 6000.

E. Expansion Joint Filler:
1. Expansion Joint Filler Material:
a. Design Criteria:
1) Resilient, flexible, non-extruding, expansion-contraction joint filler meeting requirements of ASTM D1751.
2) 1/2 inch (12.7 mm) thick.
3) Resilience:
(a) When compressed to half of original thickness, recover to minimum of seventy (70) percent of original thickness.
b. Manufacturers: As approved by Architect before use. See Section 01 6000.

F. Finishing Material (Exposed Vertical Faces of Foundation and Retaining Walls):
1. Do not apply finishing material (parge coat) to foundation or retaining walls.

G. Slab Contraction Joint Device (if used): Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
1. Manufacturers: As approved by Architect before use. See Section 01 6000.

H. Slab Construction Joint Devices (if used and required by contract drawings): Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.
1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
a. Height: To suit slab thickness.
b. Manufacturers: As approved by Architect before use. See Section 01 6000.
2. Dowel Sleeves: Plastic sleeve for smooth, round, steel load-transfer dowels.
a. Manufacturers: As approved by Architect before use. See Section 01 6000.

2.08 CURING MATERIALS

A. Membrane Curing:
1. Clear water-based, ready-to use membrane curing agent that cures freshly placed concrete, forming effective barrier against moisture loss from concrete surface.
2. Design Criteria:
a. Exterior Concrete:
1) Dissipating or non-dissipating membrane curing agent.
b. Interior Concrete:
1) Dissipating membrane curing agent only.
2) Gradually dissipate after twenty-eight (28) days without leaving stain or discoloring concrete surface.
c. VOC-compliant compound.
d. Meet requirements of ASTM C309 and AASHTO M 148, Type 1 or 1-D, Class B.
e. Interior concrete: containing no mineral spirits, naphtha, or other components detrimental to finish flooring installation.
f. Maintain ninety-five (95) percent of mix water present in concrete mass after application.
3. Horizontal and Vertical Cast-In-Place Structural Concrete:
a. Acceptable Products.
1) Exterior Concrete:

(a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg. OH www.daytonsuperior.com.
(b) Clear Water Resin by Right Point, Dekalb, IL www.rightpointe.com.
(c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE www.lmcc.com.
(d) VOCOMP 20 (do not use when concrete sealer will be applied in areas of freeze/thaw and deicer salts) by W.R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
(e) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
(f) Equal as approved by Architect before use. See Section 01 67000

2) Interior Concrete:
(a) Clear Cure J7WB by Dayton Superior Corporation, Miamisburg. OH www.daytonsuperior.com.
(b) Clear Water Resin by Right Point, Dekalb, IL www.rightpointe.com.
(c) L&M Cure R by L&M Construction Chemicals, Inc. Omaha, NE www.lmcc.com.
(1) 1100-Clear by W. R. Meadows, Inc. Hampshire, IL www.wrmeadows.com.
(d) Equal as approved by Architect before use. See Section 01 6000.

B. Water Curing:
1. Required Locations:
a. Use on polished concrete finishing surfaces in areas as shown on Contract Drawings.
b. Used on all interior concrete floor surfaces including offices that receive carpet.
c. Used on concrete surfaces in Process Area, Process Area Custodial Room, and Yard Sales Area only.
d. Used on concrete surfaces in areas as shown in Contract Documents.
2. Water-Curing Materials:
a. Type Two Acceptable Products:
1) Absorptive Cover: Meet requirements of AASHTO M 182, Class 2 burlap cloth made from jute or kenaf and weighing minimum of 9 oz per sq yd (305 grams per sq m) when dry.
2) Moisture-Retaining Cover: White, opaque membrane meeting requirements of ASTM C171 minimum.
3) Equals as approved by Architect before using. See Section 01 6000.

2.09 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

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

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

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section and before concrete is placed.
1. Notify Architect of incorrect dimensions or spot elevations in writing.
2. Do not place concrete until corrections are made and verified.

B. Detectable Warning Panels:
1. Examine substrate and verify substrate is suitable for installation of detectable warning panels:
a. Notify Architect of unsuitable conditions in writing.

b. Do not install detectable warning panels over unsuitable conditions.
c. 3) Commencement of Work by installer is considered acceptance of substrate.

3.02 PREPARATION

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

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

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

D. Concrete Mixing:
1. General:
   a. All concrete shall be machine mixed.
   b. Water gauge shall be provided to deliver exact predetermined amount of water for each batch.
   c. Reliable system must be employed to insure that no less than predetermined amount of cement goes into each batch.
   d. Re-tempering partly set concrete will not be permitted.
2. Transit Mix:
   a. Transit mix concrete may be used provided it conforms to Specifications and tests herein described and ASTM C94/C94M.
   b. Central plant producing concrete and equipment transporting it are suitable for production and transportation of controlled concrete and plant is currently approved by local state DOT.
   c. Maximum elapsed time between time of introduction of water and placing shall be one (1) hour.
   d. Minimum time of mixing shall be one (1) minute per cubic yard after all material, including water, has been placed in drum, and drum shall be reversed for an additional two (2) minutes.
   e. Mixing water shall be added only in presence of Inspecting Engineer or inspector employed by Testing Agency.
   f. Trucks shall not be overloaded in excess of rated capacity as recommended by manufacturer.
3. Cold Weather Concreting Procedures:
   a. General Requirements:
      1) Materials and equipment required for heating and protection of concrete shall be approved and available at Project site before beginning cold weather concreting.
      2) Forms, reinforcement, metallic embedments, and fillers shall be free from snow, ice, and frost. Surfaces that will be in contact with newly placed concrete, including subgrade materials, shall be 35 deg F (2 deg C) minimum at time of concrete placement.
      3) Thaw sub-grade 6 inches (150 mm) deep minimum before beginning concrete placement. If necessary, re-compact thawed material.
      4) Use no frozen materials or materials containing ice.
      5) See ACI 306.1 ‘Standard Specification for Cold Weather Concreting’ for additional requirements.
4. Hot Weather Concreting Procedures:
   a. General:
      1) Maximum concrete temperature allowed is 90 deg F (32 deg C) in hot weather.
      2) Cool aggregate and subgrades by sprinkling.
      3) Avoid cement over 140 deg F (60 deg C).
      4) Use cold mixing water or ice.
      5) Use fog spray or evaporation retardant to lessen rapid evaporation from concrete surface.

6) See ACI 305.1 ‘Specification for Hot Weather Concreting’ for additional requirements.

E. Surface Preparation:
1. Earthwork Preparation:
a. Aggregate base and subgrade:
1) Prepare aggregate base as specified in Section 312323.
2) Prepare natural soil subgrade as specified in Section 31 2200.
3) Prepare fill subgrade as specified in Section 31 2323.
2. Concrete Slab Thickness:
a. Increase thickness of concrete beneath detectable warning panels one inch (25 mm).
3. Inserts, bolts, boxes, templates, pipes, conduits, and other accessories required by Divisions 22, 23, and 26 shall be installed and inspected before placing concrete.
4. Install inserts, bolts, boxes, templates, pipes, conduits, and other accessories furnished under other Sections to be installed as part of work of this Section:
a. Tie anchor bolts for hold-down anchors and columns securely to reinforcing steel.

F. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
1. Use latex bonding agent only for non-load-bearing applications.

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

H. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

I. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before coving.

J. Removal:
1. Remove water and debris from space to be placed.
2. Vapor Retarder Over Aggregate Base: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.03 INSTALLATION OF FORMWORK

A. Forms:
1. Assemble forms so forms are sufficiently tight to prevent leakage.
2. Properly brace and tie forms.
3. Provide temporary cleanouts at base of tall forms if used to facilitate cleaning and inspection.
4. Make proper form adjustments before, during, and after concreting.
5. Use new forms, or used forms that have been cleaned of loose concrete and other debris from previous concreting and repaired to proper condition. Use APA Plyform B-B Class I, or APA HDO Plyform B-B Class I, on exposed to view concrete that do not receive a smooth rubbed finish.
6. Use metal cold joint forms when unable to place concrete for footings, foundations, and slabs in continuous pours.
7. Provide beveled 2 inch by 4 inch keys where shown on Contract Drawings for tall or heavily loaded walls.

B. Accessories:
1. General:

a. Provide for installation of inserts, templates, fastening devices, sleeves, and other accessories to be set in concrete before placing.
b. Position anchor bolts for hold-down anchors and columns and securely tie in place before placing concrete.

2. Form Release / Finish Agents:
a. Film thickness shall be no thicker than as recommended by Manufacturer.
b. Allow no release / finish agent on reinforcing steel or footings.

3. Expansion Joints:
a. Install at joints between floor slab and foundation wall where shown on Drawings.

C. Form Removal (Slab on Grade):
1. Removal of forms can usually be accomplished in twelve (12) to twenty-four (24) hours.
2. If temperature is below 50 deg F (10 deg C) or if concrete (stairs, beams, etc) depends on forms for structural support, leave forms intact for sufficient period for concrete to reach adequate strength.
3. For exposed to view surfaces that receive a smooth rubbed finish, remove forms while concrete is still “green”.
4. Metal bars or prys should not be used. Use wood wedges, tapping gradually when necessary.

3.04 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Fabricate reinforcement bars according to the Concrete Reinforcing Steel Institute (CRSI) 'Manual of Standard Practice' and details on Contract Documents.

B. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.

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

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

E. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

F. Avoid cutting or puncturing vapor retarder during reinforcement placement and concrete operations.

G. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

H. Blowtorch shall not be used to facilitate field cutting or bending or any other reinforcing work.

I. Reinforcement shall not be bent after partially embedded in hardened concrete.

J. Placing Reinforcement:
1. Comply with Concrete Reinforcing Steel Institute CRSI 'Manual of Standard Practice' recommended practice for 'Placing Reinforcing Bars' for details and methods of reinforcement placement and supports. and as herein specified.
2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations:
a. Locate and support reinforcing by chairs, runners, bolsters, bar supports, spacers, or hangers, as required as recommended by 'ACI Detailing Manual, except slab on grade work.
b. Support bars in slabs on grade and footings with specified bar supports around perimeter and at 4-1/2 feet on center each way maximum to maintain specified concrete cover.
c. Install bar supports at bar intersections.
3. Bend bars cold.

4. Dowel vertical reinforcement for formed concrete columns or walls out of footing or structure below with rebar of same size and spacing required above.
5. Securely anchor and tie reinforcement bars and dowels before placing concrete. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

K. Splices:
1. Per requirements of Structural Drawings.

L. Tolerances:
1. Provide following minimum concrete cover for reinforcement as per ACI 318 or ACI 318M.

M. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations:
1. Concrete cast against and permanently exposed to earth:
   a. Interior Slabs on Grade: 1 inch clear from top of slab at 4 inches slabs, 2 inches clear at 6 inches slabs.
      1) Sections other than Slabs: 3 inches.
   b. Concrete Exposed to Earth or Weather:
      1) No. 6 and Larger Bars: 2 inches.
      2) No. 5 and Smaller Bars, W31 and D31 Wire: 1-1/2 inches.
   c. Concrete not exposed to weather or in contact with ground:
      1) Slabs, walls, and joists:
         (a) No. 14 and No. 18 bars: 1-1/2 inches.
         (b) No. 11 bars and smaller: 3/4 inches.
      2) Beams and Columns:
         (a) Primary reinforcement, ties, stirrups and spirals: 1-1/2 inches.

3.05 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

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

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

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

E. General:
1. Place as soon after mixing as possible.
2. Deposit as nearly as possible in final position.
3. No concrete shall be deposited in water.
4. Placing of concrete shall be continuous until panel or section is complete.
5. Compact concrete in forms by vibrating and other means where required.
   a. Thoroughly consolidate concrete around reinforcing bars (Consolidation not required in concrete around reinforcing bars with Mix Type G).
   b. Use and type of vibrators shall conform to ACI 309.
6. Form vertical surfaces full depth. Do not allow concrete to flow out from under forms in any degree into landscaped areas.
7. Consolidate concrete thoroughly.
8. Do not embed aluminum in concrete.
9. Do not use contaminated, deteriorated, or re-tempered concrete.
10. Avoid accumulation of hardened concrete.
11. Dusting with cement not permitted.

F. Footings:
1. Bear 12 inches (300 mm) minimum into undisturbed earth or on mechanically compacted engineered fill. Step footings at ratio of 1-1/2 horizontal to One vertical unless detailed otherwise.
2. Level top of finish footing and leave rough.

3. Where joints are required, bulkhead, key horizontally, and dowel with two No. 5 reinforcing bars, 48 inches (1 200 mm) long.

G. Foundation Walls: Leave steel projecting where required for floor tie.

H. Interior Slabs:
   1. For continuous placing and where shown on Drawings, saw cut one inch (25 mm) deep control joints before shrinkage occurs (2 inches at 6 inch slabs) (50 mm at 150 mm slabs).
      a. Do not install control joints where Drawings indicate they are not to be installed.

I. Exterior Slabs:
   1. For continuous placing and where shown on Drawings, saw cut one inch (25 mm) deep control joints before shrinkage occurs (2 inches at 6 inch slabs) (50 mm at 150 mm slabs).

J. Miscellaneous Concrete Elements:
   1. Detectable Warning Panels:
      a. Follow Manufacturer's recommendations on following:
         1) Temperature requirements.
         2) Expansion and control joint requirements.
         3) Installation of panels.
         4) Curing of panels.
   2. Equipment Bases: Coordinate with appropriate Sections for locations and dimensions.
   3. Light Pole Bases, Mow Strips, and Aprons:
      a. Install bond breaker consisting of three (3) layers of 30 lb (13.6 kg) roofing felt between pole base and adjoining sidewalk, mow strip and building foundations, and aprons and building foundations.
   4. Mow Strips and Aprons:
      a. Aggregate base not necessary under mow strips and aprons.
      b. Form and cast mow strips in place.
      c. Elevations:
         1) Refer to Section 32 9122-Topsoil Grading for relation of finish grades to top of mow strip elevations.
         2) Refer to Civil Drawings for top of apron elevations.
      d. Compact topsoil underneath mow strips and aprons to density of undisturbed earth.
   5. Pipe Bollards:
      a. Install plumb and fill with concrete.
   6. Sidewalks, Exterior Stairs, And Landings:
      a. Slope with cross slope of 1/8 to 1/4 inch per ft (3 to 6 mm per 300 mm) (one to two percent) in direction of intended drainage.
      b. Slope away from building 1/8 to 1/4 inch per ft (3 to 6 mm per 300 mm) (one to two percent) minimum.
      c. Concrete walks shall be screeded to bring surface to grades and lines as indicated.
      d. Surface shall be floated with wood float with no coarse aggregate showing and then given broom finish before concrete sets.

K. Vertical Surfaces:
   1. Retaining Walls, Exposed Foundations, etc:
      a. Finish provided by form release / finish agent specified.
      b. Repair of Unacceptable Concrete.
   2. Immediately after removing forms, remove joints, marks, bellies, projections, loose materials, and cut back metal ties from surfaces to be exposed.
   3. Point up voids with cement mortar, 1:2 mix, and rub exposed surface with carborundum to smooth, even surface matching surrounding undamaged area.
   4. Light Pole Bases: Exposed portion to have rubbed finish.

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

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

3.06 SLAB JOINTING

A. Locate joints as indicated on drawings (do not use control joints in interior concrete slabs in meetinghouse).
   1. Concrete Control Joints on Center Spacing.
      a. Sidewalks: 4-6 feet
      b. Curbs and Gutters: 10 feet
      c. Mow Strips: 3-5 feet.
      d. Flat Drainage Structures: 10 feet.
      e. Retaining Walls with guardrails: Align with posts.
      f. Retaining Walls with Fencing: Align with posts.
   2. Concrete Expansion Joint (isolation) Joints on Center Spacing.
      a. Sidewalks, Curbs and Gutters: 40-100 feet
      b. Mow Strips and Aprons: 20-40 feet.
      c. Flat Drainage Structures: 50 feet.
      d. Retaining Walls with guardrails: 36 feet.
      e. Retaining Walls with Fencing: 50 feet.

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

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
   1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

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

E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

F. Contraction Joint Devices: Use preformed joint device, with top set flush with top of slab.

G. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

H. Seal expansion joints as specified in Section 07 9200 for following areas:
   1. Between entryway slabs and building foundations.
   2. Between sidewalks and building foundations.
   3. Concrete retaining walls.
   4. Within curbs and gutters.
   5. Within flat drainage structures and at joints between flat drainage structures and other concrete elements.

I. Expansion joints are not required to be sealed for following areas:
   1. Within aprons and where apron abuts sidewalks.
   2. Within mow strips and where mow strip abuts building foundation and sidewalks.
   3. Within sidewalks.

3.07 FLOOR FLATNESS AND LEVELNESS TOLERANCES

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

B. Correct the slab surface if tolerances are less than specified.

C. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:

1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
2. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
3. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.

D. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155 (ASTM E1155M), within 48 hours after slab installation; report both composite overall values and local values for each measured section.

E. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.

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

3.08 CONCRETE FINISHING

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

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

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, immediately after form removal.

D. Interior Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Screed Concrete.
2. Float Finish:
   a. Float as soon after screeding as possible.
   b. Consolidate surface with power-driven floats with exception of areas inaccessible to power-driven floats, which may be hand-floated.
   c. Re-straighten, cutting down high spots and filling low spots.
   d. Repeat float passes and re-straightening until surface has uniform, smooth, granular texture.
   e. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
3. Trowel Finish:
   a. Steel trowel slab after concrete has set enough to avoid bringing water and fines to surface.
   b. Perform troweling with power-driven trowels with exception of areas inaccessible to power-driven trowels, which may be hand-troweled.
   c. Continue troweling passes and re-straightening with 10 foot (3 meter) highway straightedge until surface is free of trowel marks and uniform in texture and appearance.
   d. Apply burnished, burned-out trowel finish.
   e. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
4. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
5. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

F. Concrete Polishing: See Section 03 3511.

3.09 CURING AND PROTECTION

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

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven days.
   2. High early strength concrete: Not less than four days.

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

D. Surfaces Not in Contact with Forms:
   1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by membrane curing, water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   2. Slabs and Floors To Receive Adhesive-Applied Flooring: Membrane Cure. Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   3. Slabs and Floors to Receive Polished Finish: Water cure
   4. Final Curing: Begin after initial curing but before surface is dry.
      a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
      b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.10 POST INSTALLED ANCHORS

A. General:
   1. Drill holes with rotary impact hammer drills using carbide-tipped bits.
   2. Unless otherwise shown on Drawings, drill holes perpendicular to concrete surface.
   3. Perform anchor installation in accordance with Manufacturer’s published instructions.

B. Adhesive Anchors:
   1. Clean holes in accordance with Manufacturer’s published instructions before installation of adhesive:
      a. Follow Manufacturer’s recommendations to ensure proper mixing of adhesive components.
   2. Adhesive:
      a. Inject adhesive into holes proceeding from bottom of hole and progressing toward surface so as to avoid introduction of air pockets into adhesive.
      b. Inject sufficient adhesive into hole to ensure that annular gap is filled to surface.
      c. Remove excess adhesive from surface and threads of anchor as necessary.
   3. Shim anchors with suitable device to center anchor in hole. Do not disturb or load anchors before Manufacturer’s specified cure time has elapsed.
   4. Temperature:
      a. Observe Manufacturer’s recommendations with respect to installation temperatures for adhesive anchors.
      b. Base material temperatures must be maintained above minimum temperatures allowed by Manufacturer for full required epoxy cure time.

C. Expansion Anchors:
   1. Protect threads from damage during anchor installation and prior to use.
   2. Set anchors to Manufacturer’s recommended torque, using a torque wrench. Following attainment of ten (10) percent of specified torque, one hundred (100) percent of specified torque shall be reached within 7 or fewer complete turns of nut. If specified torque is not

achieved within required number of turns, remove and replace anchor, unless otherwise directed by Architect.

D. Screw Anchors:
   1. Protect threads from damage during anchor installation and prior to use.
   2. Set anchor flush, collared.
   3. Do not exceed Manufacturer's maximum allowed torque when seating anchor.

3.11 NON-SHRINK GROUTING

A. Surface Preparation:
   1. Prepare concrete surfaces in accordance with Manufacturer's written instructions:
   2. Remove all loose materials.
   3. Clean surface of any substance that could interfere with bond on material including dirt, paint, tar, asphalt, wax, oil, grease, latex compounds, form release agents, laitance, loose toppings, foreign substances and any other residues.
   4. Saturate area to be grouted with water in accordance with Manufacturer's written instructions.

B. Mixing:
   1. Mix grout in accordance with Manufacturer's written instructions.
   2. Add mix water in amount in accordance with Manufacturer's written instructions to provide required placing consistency.
   3. Do not add water in amount that will cause bleeding or segregation of mixed grout.
   4. Do not add any sand, cement, admixtures, or fluidifiers to grout.

C. Placement:
   1. Place grout in accordance with Manufacturer's written instruction including but not limited to the following:
      a. Proper curing is required.
      b. Use cold weather or hot weather grouting procedures in accordance with Manufacturer's written instructions, as temperature dictates:
         1) Do not use at temperatures that may cause premature freezing.
         2) Do not allow to freeze until 4000 psi (27.6 MPa) is attained.
      c. Employ cold weather or hot weather grouting practices as temperatures dictates.
   2. Completely eliminate air pockets and provide full contact between grout and item being grouted. Do not exceed Manufacturer's recommended thickness.

D. Curing:
   1. Cure grout in accordance with Manufacturer's written instructions or ACI curing practices.
   2. Wet cure grout until forms are removed.
   3. Seal grout surfaces after forms are removed as recommended by Manufacturer.

E. Keep grout surfaces wet after curing compound has dried for as long as recommended by Manufacture.

F. Protect placed grout from freezing until minimum strength of 4000 psi (27.58 MPa) is reached.

G. Protect placed grout from damage during construction.

3.12 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. Quality Control is sole responsibility of Contractor.
   1. Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
      a. Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.

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

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

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

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

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

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

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

J. Permeability Test: Test concrete with waterproofing admixture according to COE CRD-C 48.

K. Precast Concrete:
   1. Testing Agency shall provide inspection including following:
      a. Review all precast plant test reports.
      b. Provide inspection of all precast during construction, transportation, and erection, verifying precast is undamaged, and installed in accordance with requirements of Contract Documents.
      c. Provide inspection of precast concrete anchorages to other components of structure.

L. Expansion Anchors / Adhesive Anchors / Screw Anchors:
   1. Certified Inspector from Testing Agency shall verify procedures used for installation of all concrete anchors and monitor their installation for compliance with Manufacturer's requirements.
   2. Inspections:
      a. Inspections shall include required verification and inspection of anchors as referenced in IBC Table 1704.4 and in accordance with most current version of ACI 318 or ACI 318M and applicable ASTM material standards that:
         1) The correct rod/anchor is used; size and type.
         2) The correct hole size is used and prepared per Manufacturer's instructions.
         3) That climactic conditions, and concrete temperature, allow for the anchors' installation and use.
         4) Proper hole cleaning equipment, per Manufacturer's instructions, is used.
         5) Torque applied to anchors does not exceed Manufacturer's allowable limits.
            (a) Torque applied to anchors is per Manufacturer's instructions.

3.13 DEFECTIVE CONCRETE

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

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

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

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

3.14 PROTECTION

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

B. Protect installed products from damage during construction.

END OF SECTION 03 3000

BLANK PAGE

SECTION 04 0121

UNIT MASONRY REPOINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Remove existing mortar to specified depth, clean joints, and tuck-point as described in Contract Documents.
   2. Remove, clean, and reinstall existing masonry units as described in Contract Documents.
   3. Remove existing masonry units and replace with new masonry units as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM C150/C150M-18, 'Standard Specification for Portland Cement'.
      b. ASTM C207-18, 'Standard Specification for Hydrated Lime for Masonry Purposes'.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Materials:
   1. Design Criteria:
      a. Hydrated Lime: Meet requirements of ASTM C207, Type S.
      b. Portland Cement: Meet requirements of ASTM C150/C150M, Type II, White (non-staining).
      c. Aggregate:
         1) Match existing as much as possible.
         2) Generally, sand with rounded edges is preferred.
   2. Color:
      a. Match existing mortar color unless otherwise agreed to.
      b. This will generally require fresh mortar to be slightly darker than existing to compensate for natural bleaching with age.
   3. Water: Clean, drinkable.

B. Mixes:
   1. Pointing mortar shall be softer or no harder than existing mortar. Unless agreed to otherwise, mix may be one part lime and 2 parts sand. Portland cement may be added up to twenty (20) percent of total lime and sand. Use no admixtures.
   2. Mix dry ingredients, then add about half water and mix for five minutes. Add additional water slowly until proper consistency is reached. Use mortar within 30 minutes. Do not re-temper.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Interface With Other Work: Coordinate work of this Section with general masonry cleaning so all, except final pointing, is completed before general masonry cleaning, if any.

B. Remove mortar from joint 2-1/2 times deeper than joint width or one inch, whichever is greater, with hammer and cold chisel or other suitable hand tools. Do not use power tools unless it can be demonstrated to Architect's satisfaction that masonry surfaces will not be damaged.

C. Remove masonry from designated areas, if any, and clean mortar from salvageable removed units and from surrounding units in wall. Re-lay masonry units in wall leaving raked joint to approximate depth of existing joints prepared for repointing. Mortar for re-laying shall be as specified in Section 04 0513.

D. Clean joints with combination of water flushing and brushing with bristle brush.

E. Work fresh mortar from 'hawk' to joint with jointing tool. First fill recessed areas, which are deeper than standard chiseled depth, and then proceed to fill raked joint using several layers of mortar and working tool in one direction only. Each layer of mortar shall be thumbprint hard before succeeding layer is applied. Where corners of face brick have eroded, it may be necessary to recess mortar to some degree in order to maintain consistent visual width of joints.

F. Perform final tooling when mortar is thumbprint hard.

3.2 CLEANING

A. Clean face of masonry one to two hours after mortar has set.
   1. Use plain stiff bristle brush.
   2. If mortar has become too hard, use brush and plain water and wooden paddle or, if necessary, a chisel.
   3. If harsher cleaning methods are required, allow mortar to cure thirty (30) days before commencing.

END OF SECTION

SECTION 04 0131

UNIT MASONRY CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Clean exterior masonry surfaces as described in Contract Documents.

B. Related Requirements:
   1. Section 07 1900: 'Water Repellent'.

1.2 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Adhere to applicable City, State, and Federal EPA laws and requirements.
   2. Require applicators to observe applicable Federal and State Agency, industry, and Manufacturer recommended safety regulations and precautions. Applicators shall wear safety goggles, rubber gloves, and plastic or rubber rain suits so as to avoid splash to skin or eyes.

B. Qualifications:
   1. Installers:
      a. Applicators performing work of this section shall have five years' minimum experience using specified restorative cleaning techniques.

C. Field Samples:
   1. Fundamental consideration for selection of appropriate cleaning procedures shall be that materials and techniques adopted do minimal or no damage to masonry substrates while achieving desired degree of cleaning.
   2. Architect will approve location of test areas.
   3. Clean test areas with recommended specified cleaning material for inspection and approval of Architect.
   4. Conduct tests on each building exposure in unobtrusive locations on representative staining conditions.
   5. Tests shall employ cleansing operation and include evaluation of all surfaces to be cleaned.
   6. Test samples of adjacent non-masonry materials for possible reaction with cleaning materials.
   7. Test procedures shall include evaluation of materials and techniques proposed for protection of surrounding and adjacent non-masonry surfaces from cleaning solutions and rinse waters.
   8. Representative of Cleaning Materials Manufacturer shall be present during preparation and application of cleaning materials for all test areas.
   9. Do not begin full scale cleaning operations until Architect has approved cleaning results in test areas and application procedures.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:
   1. Purchase and store on site in factory sealed containers sufficient cleaning materials to complete Project.
   2. Containers shall be available for inspection.

1.4 FIELD CONDITIONS

A. Ambient Conditions:
   1. Conduct cleaning operations at time of year when treated masonry surfaces will have adequate time to thoroughly dry without fear of freezing. Do not perform masonry cleaning at temperatures below 40 deg F (4 deg C), or when local Weather Service reports indicate temperatures below 40 deg F (4 deg C) during ensuing 24 hours are imminent, unless heated rinse water will be used and if approved in writing by Architect.
   2. Do not perform masonry cleaning during winds sufficiently strong to spread sprayed compound to adjacent unprotected surfaces.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Manufacturers:
   1. Manufacturer Contact List:
      a. Diedrich Technologies, Oak Creek, WI www.diedrichtechnologies.com.
      b. Sure Klean Products by ProSoCo Inc, Kansas City, KS www.prosoco.com.

B. Description:
   1. This specification describes cleaning systems designed to effectively clean and restore exterior masonry surfaces.
   2. Selection of specific cleaners to be used shall be dependent on type of substrate, its condition, and results of tests conducted at job site as specified below.
   3. Sandblasting and use of non-proprietary acids, alkalis, powdered or liquid, is not permitted.
   4. Application shall be in accordance with Manufacturer's recommendations and as approved in writing by Owner.

C. Materials:
   1. Paint Stripper I:
      a. Primarily for removal of graffiti, paint spills or drips, spray paints, inks and crayons. May be used for heavy-duty coatings, epoxies, urethanes, floor enamels and other chemically resistant coatings.
      b. Type One Acceptable Products:
         1) Sure Klean 509 Paint Stripper.
         2) Diedrich 505 Special Coatings Stripper.
         3) Equals as approved by Architect before bidding. See Section 01 6200.
   2. Paint Stripper II:
      a. Formulated specifically for removal of certain types of latex and lacquer paints.
      b. Type One Acceptable Products:
         1) Sure Klean 940 Paint Stripper.
         2) Diedrich 505, 505X.
         3) Equals as approved by Architect before bidding. See Section 01 6200.
   3. Paint Stripper III:
      a. For removing multiple layers of paint coatings and graffiti from exterior masonry surfaces.
      b. Type One Acceptable Products:
         1) Sure Klean Heavy Duty Paint Stripper.
         2) Diedrich 606 Paint Remover.
         3) Equals as approved by Architect before bidding. See Section 01 6200.
   4. Asphalt And Tar Remover:
      a. For removal of asphalt / tar roofing spills, grease, hydraulic oil, motor oil, and other similar stains from masonry surfaces.
      b. Type One Acceptable Products:
         1) Sure Klean Asphalt And Tar Remover.
         2) Diedrich 920 Asphalt And Tar Remover.

3) Equals as approved by Architect before bidding. See Section 01 6200.

5. Prewash I:
   a. Formulated for use with Restoration Cleaner I, Limestone Afterwash, and Restorer I.
   b. Acts as 'carbon solubilizer' and assists in removing heavy carbon encrustations from brick, terra cotta, sandstone, limestone, and most other masonry.
   c. Type One Acceptable Products:
      1) Sure Klean 766 Prewash.
      2) Diedrich 808 Limestone Prewash.
      3) Equals as approved by Architect before bidding. See Section 01 6200.
6. Prewash II:
   a. For use on difficult to clean masonry where restoration cleaner alone does not do an adequate job of cleaning masonry surface.
   b. Type One Acceptable Products:
      1) Sure Klean 792 Masonry Prewash.
      2) Diedrich 707X, 808X.
      3) Equals as approved by Architect before bidding. See Section 01 6200.
7. Restoration Cleaner I:
   a. For removing atmospheric staining with heavy deposits of carbon and dirt, paint oxidation, embedded clay and mud stains, rust, smoke, and algae.
   b. Effective on brick, granite, sandstone, unpolished marble, and most other types of masonry surfaces. Do not use on limestone surfaces.
   c. Type One Acceptable Products:
      1) Sure Klean Restoration Cleaner.
      2) Diedrich 101G Restoration Cleaner.
      3) Equals as approved by Architect before bidding. See Section 01 6200.
8. Restorer:
   a. For removing atmospheric and organic stains from high calcium based natural limestone, precast limestone, concrete, exposed aggregate, and similar masonry surfaces.
   b. Type One Acceptable Products:
      1) Sure Klean Limestone Restorer.
      2) 202 New Masonry Detergent.
      3) Equals as approved by Architect before bidding. See Section 01 6200.
9. Limestone Prewash And Limestone Afterwash:
   a. For removing heavy carbon, dirt, and other atmospheric stains from porous limestone surfaces.
   b. Most appropriate for cleaning extremely old limestone surfaces and limestone structures in high pollution areas.
   c. Type One Acceptable Products:
      1) Sure Klean Limestone Prewash and Sure Klean Limestone Afterwash.
      2) Diedrich 707X Limestone Cleaner Pre-Rinse and 707N Limestone Neutralizer After-Rinse.
      3) Equals as approved by Architect before bidding. See Section 01 6200.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection Of In-Place Conditions:
   1. Provide covered access to building for public, employees, and service vehicles at all times.
   2. Protect, or avoid contact with, auto and pedestrian traffic.
   3. Protect aluminum, wood, and painted surfaces from exposure to cleaning solution. Also protect plants and shrubbery.
   4. Protect surrounding landscape and lawn areas from contact with cleaning solutions.
      a. Landscape and lawn areas may be best protected by keeping them as wet as possible through use of lawn soaker hoses which provide a slow but steady mist of water to areas adjacent to masonry being cleaned.

b. Root systems of adjacent trees and shrubs exposed to cleaning rinse waters can be protected with use of neutralizing trenches.

5. Protect non-masonry surfaces that are not to be replaced from contact with cleaning solution.
   a. Protect wooden and painted surfaces with sheets of polyethylene or other proven protective materials, firmly fixed and sealed to surface.
   b. Keep non-masonry surfaces, which are not protected, running-wet with clean water throughout cleaning process of adjacent masonries.

B. Surface Preparation:
1. Complete paint stripping and cleaning procedures before installation of new window glazing and paint finishes. Failure to do so will make it necessary to protect such finishes from contact with cleaning and paint stripping agents.
2. Test surfaces not to be cleaned for possible detrimental effects of cleaning solutions and protect as determined necessary by test results.
3. Temporarily calk or otherwise protect open joints to prevent intrusion of washing waters into wall structure or building interior.

3.2 APPLICATION

A. General:
1. Any dilution of cleaning materials will be with clean water in accordance with instructions on Manufacturer's printed container label.
2. Surface Treatment:
   a. Thoroughly pre-wet surfaces, which are to be treated with water soluble materials, with clean water before application of cleaning materials. Do not pre-wet surfaces to be cleaned with materials containing solvents, such as Paint Strippers I, II, and III, and Asphalt And Tar Remover.
   b. Purpose of pre-wetting is to limit activity of cleaning solution to masonry surface and prevent cleaning solutions from being too readily absorbed by dry masonries. Failure to adequately pre-wet may result in streaking and other residual staining of treated masonries.
3. Pressure Application:
   a. Use high pressure rinsing equipment for pre-wetting and rinsing procedures described below. Pressures of 400 to 800 psi (2.76 to 5.52 MPa) and a flow rate of 4 to 6 gallons (18 to 27 liters) per minute have proved most effective.
   b. Use low-pressure spray application for cleaning materials. High pressure application may drive cleaning compounds deep into masonry surface making it impossible to rinse treated surfaces free of cleaning residues.
   c. If spray application of cleaning solution is desired, apply cleaning agents with 50 psi (0.35 MPa) maximum spray equipment.
   d. Equipment that can apply hot water shall be controllable so water temperatures do not exceed 160 deg F (71 deg C).
4. In areas of high public traffic, perform cleaning operations at night.
5. Rinse chemicals after appropriate dwell time using garden hose just before rinsing with high-pressure equipment.
6. Avoid cleaning at times of extreme or excessive winds.
7. When cleaning from scaffolding in traffic areas, drape scaffolding with plastic or burlap to reduce spray drift.
8. When working in an area of public foot traffic, build shed over sidewalk to protect pedestrian traffic.

B. Paint Stripper I:
1. Remove as much paint / stain matter as is practical with hand scrappers.
2. Using a natural fibered cleaning brush, roller or large paint brush, apply a heavy, thick coating of paint stripper to painted / stained areas.
3. Allow paint stripper to remain until paint / stain 'lifts' or shows signs of dissolving. Do not allow stripper to dry on surface.
4. Rinse treated surfaces thoroughly with fresh water using pressure washing equipment to remove paint stripper and dissolved paint/stain material.

C. Paint Stripper III:
   1. Using synthetic fibered brush, roller, or appropriate spray equipment, apply a heavy, thick coating of paint stripper to painted surfaces. On surfaces that have multiple coats of paint, sufficient material should be applied to produce a 1/8 inch (3 mm) buildup of stripper on surface.
   2. Allow paint stripper to remain on surface for 4 to 24 hours until paint is obviously dissolved. On surfaces that have received 15 to 20 coats of paint, second application of paint stripper directly over first application, before rinsing, will frequently improve efficiency of stripping operation.
   3. Rinse treated surfaces thoroughly with fresh water using pressure washing equipment to remove all paint stripper and solubilized paint material.
   4. Reapply as required to removal all traces of paint coatings.
   5. When all paint has been removed, use a restoration cleaner to remove all traces of stripper and to clean exposed masonry.

D. Asphalt And Tar Remover:
   1. Using densely packed masonry washing brush or low-pressure spray, apply Asphalt And Tar Remover liberally to dry masonry surface. When using spray application beware of drift and employ solvent resistant spraying devices.
   2. Allow cleaning solution to stay on wall for several minutes.
   3. Reapply cleaning solution to stained areas with vigorous scrubbing manner with a stiff fibered masonry washing brush.
   4. Rinse treated surfaces thoroughly with fresh water employing full city water pressure or pressure washing equipment removing all cleaning compounds and staining matter.
   5. Allow masonry surfaces to thoroughly dry before determining cleaning results.
   6. Reapply as necessary.

E. Prewash:
   1. Apply heavy coating of Prewash to masonry surface using synthetic fiber brush or roller.
   2. Allow material to remain on surface until carbon stains are dissolved. Do not allow prewash to dry on surface.
   3. Rinse treated surfaces thoroughly with fresh water, employing pressure equipment removing all cleaning compound, dirt, etc.
   4. Apply a Restoration Cleaner to area treated using a natural fiber masonry washing brush or low pressure spray.
   5. Allow solution to dwell on surface three to five minutes depending on drying conditions. Do not allow cleaning solution to dry in.
   6. Rinse treated surfaces thoroughly with fresh water employing pressure washing equipment removing all cleaning compounds, dirt, stains, etc.

F. Restoration Cleaner I:
   1. Apply cleaning solution liberally to masonry surface using low-pressure spray or densely packed, soft fibered masonry washing brush.
   2. Allow cleaning solution to remain on wall for 3 to 5 minutes depending upon drying conditions. Do not allow cleaning solution to dry in.
   3. Reapply cleaning solution in a scrubbing manner.
   4. Rinse treated surfaces thoroughly with fresh water employing pressure washing equipment removing all cleaning compounds, dirt, etc.
   5. Reapply as necessary.

G. Restoration Cleaner II:
   1. Apply cleaning solution liberally to masonry surface using low-pressure spray or densely packed, soft fibered masonry washing brush.
   2. Allow cleaning solution to remain on wall for three to five minutes depending upon drying conditions. Do not allow cleaning solution to dry in.
   3. Reapply cleaning solution in a scrubbing manner.
   4. Rinse treated surfaces thoroughly with fresh water employing pressure washing equipment removing all cleaning compounds, dirt, etc.
   5. Reapply as necessary.

H. Restorer:

1. Apply cleaning solution liberally to masonry surface using low-pressure spray or densely packed, soft fibered masonry washing brush.
2. Allow cleaning solution to remain on wall for three to five minutes depending upon drying conditions. Do not allow cleaning solution to dry in.
3. Reapply cleaning solution in a scrubbing manner.
4. Rinse treated surfaces thoroughly with fresh water employing pressure washing equipment removing all cleaning compounds, dirt, etc.
5. Reapply as necessary.

I. Limestone Prewash / Afterwash:
1. Apply heavy coating of Limestone Prewash to masonry surface using synthetic fiber brush or roller.
2. Allow material to remain on surface until carbon stains are dissolved. Do not allow cleaning solution to dry in.
3. Rinse treated surfaces thoroughly with fresh water employing pressure washing equipment removing all cleaning compound, dirt, etc.
4. Immediately apply solution of Afterwash as specified below.
5. Apply prepared solution (diluted two parts water to one part concentrated cleaner) to area treated using natural fiber masonry washing brush or low pressure spray.
6. Allow solution to dwell on surface 3 to 5 minutes depending on drying conditions. Do not allow cleaning solution to dry in.
7. Rinse treated surfaces thoroughly with fresh water employing pressure washing equipment removing all cleaning compounds, dirt, stain, etc.

J. Strippable Masking:
1. Test surfaces to be coated to verify ease of removal before general application. Surfaces should be clean and free of contaminants.
2. Using brush or roller:
   a. Apply masking material so as to provide a build-up of 2.0 dry mils of coating.
3. Allow masking to dry before exposing coating to cleaning application.
4. Remove within 15 days (exterior) to 60 days (interior) by pulling corner of coating free of surface and continue to pull coating from surface.

3.3 CLEANING

A. Remove and dispose of masking materials following completion of cleaning operation. Leave windows and non-masonry areas clean.

B. Sweep or flush residue washed from building surface away from surrounding sidewalk and service areas nightly. Premises shall be clean and neat at all times.

END OF SECTION

SECTION 07 1900

WATER REPELLENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and apply water repellent system to exposed exterior brick masonry as described in Contract Documents.

B. Related Requirements:
   1. Section: 04 0131: 'Unit Masonry Cleaning'.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference: Schedule pre-installation conference for same time as application of test application.

1.3 SUBMITTALS

A. Action Submittals:
   1. Product Data: Manufacturer's product data including data substantiating that specified materials are recommended by Manufacturer for applications shown.

B. Informational Submittals:
   1. Manufacturer Instructions: Printed application instructions.

1.4 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Comply with applicable VOC standards and other local requirements.

B. Qualifications:
   1. Installer:
      a. Installer shall be acceptable to Manufacturer as applicator of its product.
      b. Minimum five (5) satisfactorily completed installations of comparable quality, scope, similar size, and complexity in past two (2) years before bidding.

C. Preconstruction Testing:
   1. Test substrate for moisture content. Do not apply if moisture contents of wall not within limits acceptable to Manufacturer.
   2. Apply 10 foot (3 meter) square test application for review of substrate preparation procedures and application methods.

1.5 FIELD CONDITIONS

A. Ambient Conditions:
   1. Temperatures at time of application:
      a. Silane: Between 40 and 75 deg F (4 and 24 deg C).
      b. Siloxane: Between 40 and 100 deg F (4 and 38 deg C).

2. No precipitation shall have occurred within 24 hours of application or be expected for 48 hours minimum after completion of application.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Type One Acceptable Products:
   1. Silane:
      a. Hydrozo Enviroseal 20 by Hydrozo, Shalopee, MN www.buildingsystems.basf.com.
      b. Rainstopper 120 by TexCote - Textured Coatings of America, Panama City, FL www.texcote.com.
      c. Weather Worker S-20 (J-28) by Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.
   2. Siloxane:
      a. Prime A Pell 200 by Chemprobe, Div Tnemec, North Kansas City, MO www.tnemec.com.
      b. Rainstopper 600 by TexCote - Textured Coatings of America, Panama City, FL www.texcote.com.
      c. Sure Klean Weather Seal Siloxane WB Concentrate by ProSoCo, Lawrence, KS www.prosoco.com.
      d. Weather Worker WB (J-26-WB) by Dayton Superior Specialty Chemicals, Kansas City, KS www.daytonsuperiorchemical.com.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not apply water repellent until after installation of sealants in areas to receive water repellants and adjoining areas.

B. Clean substrate of substances that will interfere with penetration and adhesion of water repellent.

C. Protect adjoining work from spillage or blow-over as recommended by Manufacturer.

3.2 APPLICATION

A. Apply two heavy saturation spray coats beginning at bottom of walls and following Manufacturer's written application instructions.

3.3 CLEANING

A. Immediately clean adjoining surfaces of spillage and overspray as recommended by Manufacturer.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sealants not specified to be furnished and installed under other Sections.
   2. Quality of sealants to be used on Project not specified elsewhere, including submittal, material, and installation requirements.

B. Related Requirements:
   1. Removing existing sealants specified in Sections where work required.
   2. Furnishing and installing of sealants is specified in Sections specifying work to receive new sealants.
   3. Section 07 2400: Sealants for EIF Systems.

C. Products Furnished But not Installed Under This Section:
   1. Interior Ceramic Tile Joint Sealants:

D. Related Requirements:
   1. Section 09 3000: 'Tiling'.

1.02 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM C920-14a, ‘Standard Specification for Elastomeric Joint Sealants’.
      b. ASTM C1193-16, ‘Standard Guide for Use of Joint Sealants’.
      c. ASTM C1330-02(2013), ‘Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants’.
      d. ASTM C1481-12(2017) 'Standard Guide for Use of Joint Sealants with Exterior Insulation & Finish Systems (EIFS)'.
      e. ASTM D5893/D5893M-16, ‘Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements’.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

B. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.

C. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2018.

D. ASTM C1481 - Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EIFS) 2012.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.

F. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).

G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

H. ASTM C834 - Standard Specification for Latex Sealants 2017.

I. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications 2022.

J. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Scheduling:
   1. Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.
   2. Ensure sealants are cured before covering with other materials.

1.05 SUBMITTALS

A. Action Submittals:
   1. Product Data:
      a. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
      b. Manufacturer's literature for each Product.
      c. Schedule showing joints requiring sealants. Show also backing and primer to be used.

B. Informational Submittals:
   1. Certificates:
      a. Manufacturer's Certificate:
         1) Certify products are suitable for intended use and products meet or exceed specified requirements.
         2) Certificate from Manufacturer indicating date of manufacture.
   2. Manufacturers' Instructions:
      a. Manufacturer's installation recommendations for each Product.
      b. Manufacturer's installation for completing sealant intersections when different materials are joined.
      c. Manufacturer's installation for removing existing sealants and preparing joints for new sealant.

1.06 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum ten (10) years documented experience.
   2. Applicator Qualifications:
      a. Company specializing in performing work of this section.
      b. Provide if requested, reference of projects with minimum three (3) years documented experience, minimum three (3) successfully completed projects of similar scope and complexity, and approved by manufacturer.
      c. Designate one (1) individual as project foreman who shall be on site at all times during installation.

B. Preconstruction Testing:
   1. Pre-construction testing is not required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work.

C. Mockups:
   1. Provide mockups including sealant and joint accessories to illustrate installation quality and color if requested by Architect or Project Manager.
      a. Incorporate accepted mockup as part of Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Deliver and keep in original containers until ready for use.
   2. Inspect for damage or deteriorated materials.

B. Storage and Handling Requirements:

1. Handle, store, and apply materials in compliance with applicable regulations and material safety data sheets (MSDS).
2. Handle to prevent inclusion of foreign matter, damage by water, or breakage.
3. Store in a cool dry location, but never under 40 deg F (4 deg C) or subjected to sustained temperatures exceeding 80 deg F (27 deg C) or as per Manufacturer's written recommendations.
4. Do not use sealants that have exceeded shelf life of product.

1.08 FIELD CONDITIONS

A. Ambient Conditions:
1. Do not install sealant during inclement weather or when such conditions are expected. Allow wet surfaces to dry.
2. Follow Manufacturer’s temperature recommendations for installing sealants.
3. Ambient Conditions:
a. Do not apply caulking at temperatures below 40 deg F (4 deg C).

1.09 WARRANTY

A. Manufacturer Warranty:
1. Signed warranties against adhesive and cohesive failure of sealant and against infiltration of water and air through sealed joint for period of three (3) years from date of Substantial Completion.
a. Manufacturer's standard warranty covering sealant materials.
b. Applicator’s standard warranty covering workmanship.

PART 2 PRODUCTS

2.01 SYSTEMS

A. Manufacturers:
1. Manufacturer Contact List:
a. Dow Corning Corp., Midland, MI www.dowcorning.com.
b. Franklin International, Inc. Columbus, OH www.titebond.com.
c. GE Sealants & Adhesives (see Momentive Performance Materials Inc.).
d. Laticrete International Inc., Bethany, CT www.laticrete.com.
e. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/silicones.
f. Sherwin-Williams, Cleveland, OH www.sherwin-williams.com.
g. Sika Corporation, Lyndhurst, NJ www.sikaconstruction.com or Sika Canada Inc, Pointe Claire, QC www.sika.ca.
h. Tremco, Beachwood, OH www.tremcosealants.com or Tremco Ltd, Toronto, ON (800) 363-3213.

B. Materials:
1. Design Criteria:
a. Compliance: Meet or exceed requirements of these standards:
1) ASTM C920: Elastomeric joint sealant performance standard.
2) ASTM D5893/D5893M: Silicone Joint Sealant for Concrete Pavements.
b. Comply with Manufacturer’s ambient condition requirements.
c. Sealants must meet Manufacturer's shelf-life requirements.
d. Sealants must adhere to and be compatible with specified substrates.
e. Sealants shall be stable when exposed to UV, joint movements, and environment prevailing at project location.
f. Primers (Concrete, stone, masonry, and other nonporous surfaces typically do not require a primer. Aluminum and other nonporous surfaces except glass require use of a primer. Installer Option to use Adhesion Test to determine if primer is required or use primer called out in related sections):
1) Adhesion Test:

(a) Apply silicone sealant to small area and perform adhesion test to determine if primer is required to achieve adequate adhesion. If necessary, apply primer at rate and in accordance with Manufacturer's instructions. See 'Field Quality Control' in Part 3 of this specification for Adhesive Test.

2) If Primer required, shall not stain and shall be compatible with substrates.

3) Allow primer to dry before applying sealant.

2. Sealants At Exterior Building Elements:

a. Description:

1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:

(a) Aluminum entrance perimeters and thresholds.
(b) Columns.
(c) Connections.
(d) Curtainwalls.
(e) Door frames.
(f) EIFS to metal joints.
(g) Joints and cracks around windows.
(h) Louvers.
(i) Masonry.
(j) Parapet caps.
(k) Wall penetrations.
(l) Other joints necessary to seal off building from outside air and moisture.

b. Design Criteria:

1) Meet following standards for Sealant:

(a) ASTM C920: Type S, Grade NS, Class 50 Use NT, M, G, A.

2) Limitations:

(a) Do not use below-grade applications.
(b) Do not use on surfaces that are continuously immersed or in contact with water.
(c) Do not use on wet, damp, frozen or contaminated surfaces.
(d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.

3) Color:

(a) Architect to select from Manufacturer's standard colors.
(b) Match building elements instead of window (do not use white that shows dirt easily).

c. Approved Products. See Section 01 6000:

1) Dow Corning:

(a) Primer: 1200 Prime Coat.
(b) Sealant: 791 Silicone Weatherproofing Sealant.

2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):

(a) Primer: SS4044 Primer.
(b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.

3) Tremco:

(a) Primer:
(1) Metal surface: No. 20 primer.
(2) Porous surfaces: No. 23 primer.
(b) Sealant: Spectrum 1 Silicone Sealant.

3. Sealants At EIFS:

a. Description:

1) Weatherproofing sealant for long term resistance to natural weathering, including: ultraviolet radiation, high and low temperatures and rain and snow,

with negligible change in elasticity. May be used for application to horizontal or vertical surfaces.

b. Design Criteria:
   1) Meet following standards for Sealant:
      (a) Used to seal EIFS to EIFS, not EIFS to other material.
      (b) ASTM C920: Type S, Grade NS, Class 100/50 Use NT, A, G, O.
      (c) ASTM C1481 guidelines for use of sealant with EIFS.
   2) Limitations:
      (a) Do not use in structural glazing applications.
      (b) Do not use on surfaces that are underwater or in continuous contact with water.
      (c) Do not use on porous substrates.
      (d) Do not use on wet, damp, frozen or contaminated surfaces.
      (e) Do not use on surfaces where staining or discoloration may be concern, without prior testing.
      (f) Do not use on excessively basic or acidic substrates.
   3) Color:
      (a) Architect to select from Manufacturer's standard colors.
      (b) Match building elements (do not use white that shows dirt easily).

c. Approved Products. See Section 01 6000:
   1) Dow Corning:
      (a) Primer: 1200 Prime Coat.
      (b) Sealant: 790 Silicone Building Sealant.
   2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
      (a) Primer: SCP3195P Primer.
      (b) Sealant: GE SCS2700 SilPruf LM Silicone Weatherproofing Sealant.
   3) Sika:
      (a) Primer: Sikaflex Primer 429.
      (b) Sealant: Sikaflex 2C NS Non-Sag Silicone Sealant.
   4) Tremco:
      (a) Primer: Porous surfaces: No. 23 primer.
      (b) Sealant: Spectrum 1 Silicone Sealant.

4. Sealants At Exterior Sheet Metal And Miscellaneous:

a. Description:
   1) Weathersealing expansion, contraction, perimeter, and other movement joints which may include all or part of the following for project:
      (a) Flashings.
      (b) Gutters.
      (c) Penetrations in soffits and fascias.
      (d) Roof vents and flues.
      (e) Lightning protection components.

b. Design Criteria:
   1) Meet following standards for Sealant:
      (a) ASTM C920: Type S Grade NS, Class 25 (min) Use NT, M, G, A and O.
   2) Limitations:
      (a) Do not use below-grade applications.
      (b) Do not use on surfaces that are continuously immersed or in contact with water.
      (c) Do not use on wet, damp, frozen or contaminated surfaces.
      (d) Do not use on building materials that bleed oils, plasticizers or solvents, green or partially vulcanized rubber gaskets or tapes.

c. Approved Products. See Section 01 6000:
   1) Dow Corning: 790 Silicone Building Sealant.

2) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2350 Silicone Elastomeric Sealant.
3) Tremco: Tremsil 600 Silicone Sealant.

5. Sealants At Expansion Joints in Exterior Concrete (Aprons, Entryway Slabs, Mowstrips, Retaining Walls, Sidewalks):
   a. Expansion Joints:
      1) Design Criteria:
         (a) Meet following standards for Sealant:
            (1) ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
      2) Sealant required at expansion for following areas:
         (a) Between entryway slabs and building foundations.
         (b) Between sidewalks and building foundations.
         (c) Miscellaneous vertical applications.
      3) Sealant NOT required at expansion joints for following areas:
         (a) Within aprons and where aprons abut building foundations and sidewalks.
         (b) Within mowstrips and where mowstrips abut building foundations and sidewalks.
         (c) Within sidewalks.
      4) Approved Products. See Section 01 6000:
         (a) Dow Corning:
            (1) Primer: 1200 Prime Coat.
            (2) Sealant: 790 Silicone Building Sealant.
         (b) Sika:
            (1) Primer: Sikasil Primer-2100.
            (2) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.
   b. Penetrations thru Concrete Walls:
      1) Design Criteria:
         (a) Meet following standards for Sealant:
            (1) ASTM C920: Type S, Grade NS, Class 100/50 Use T, NT, M, G, A, and O.
      2) Approved Products. See Section 01 6000:
         (a) Dow Corning:
            (1) Primer: 1200 Prime Coat.
            (2) Sealant: 790 Silicone Building Sealant.
         (b) Sika:
            (1) Primer: Sikasil Primer-2100.
            (2) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.

6. Sealants At Control Joints in Exterior Concrete (Aprons, Entryway Slabs, Mowstrips, Retaining Walls, Sidewalks):
   a. Control Joints:
      1) Design Criteria:
         (a) Meet following standards for Sealant:
            (1) ASTM C920, Type S, Grade P, Class 100/50; Use T, M, G, A, O.
      2) Sealant required at control joints in following areas:
         (a) Retaining walls.
         (b) Miscellaneous vertical applications.
      3) Sealant is NOT required at control joints, unless needed to protect moisture sensitive soils or by Contract Drawings, in following areas:
         (a) Within aprons.
         (b) Within mowstrips.
         (c) Within sidewalks.
         (d) Within entryway slabs.

4) Approved Products. See Section 01 6000:
(a) Dow Corning:
(1) Primer: 1200 Prime Coat.
(2) Sealant: 890-SL Silicone Building Sealant.
(b) Sika:
(1) Primer: Primer: Sikasil Primer-2100.
(2) Sealant: Sikasil-728 SL Self-leveling Silicone Sealant.

7. Sealants At Exterior Concrete Waterways - Flat Drainage Structures (Waterways:
a. Expansion Joints and Control Joints:
1) Description:
(a) One component (part) self-leveling silicon material that cures to ultra-low modulus silicone rubber upon exposure to atmospheric moisture.
(b) Cured silicone rubber remains flexible over entire temperature range expected in pavement applications.
2) Design Criteria:
(a) Sealant is required at following areas:
(1) Within flat drainage structures and at joints between flat drainage structures and other concrete elements.
(b) Meet following standards for Sealant: Self-leveling: ASTM D-5893; ASTM C920, Type S, Grade P, Class 100/50; Use T, M, G, A, O.
3) Approved Products. See Section 01 6200:
(a) Dow Corning:
(1) Primer: 1200 Prime Coat.
(2) Sealant: 890-SL Silicone Building Sealant.
(b) Sika:
(1) Primer: Primer: Sikasil Primer-2100.
(2) Sealant: Sikasil-728 SL Self-leveling Silicone Sealant.

8. Sealants At Curbs And Gutters:
a. Expansion Joints and Control Joints:
1) Description:
(a) Effective for sealing transverse contraction and expansion joints, longitudinal, center line and shoulder joints in Portland cement concrete.
(b) One component (part) non-sag silicone material that cures to low modulus, silicone rubber upon exposure to atmospheric moisture. May be applied over wide temperature range.
2) Design Criteria:
(a) Expansion joint sealant is required in following areas:
(1) Within curbs and gutters at approved layout locations.
(b) Meet following standards for Sealant: Non-sag: ASTM C920: Type S, Grade NS, Class 100/50, Use T, NT.
3) Approved Products. See Section 01 6000:
(a) Dow Corning:
(1) Primer: 1200 Prime Coat.
(2) Sealant: 888 Silicone Joint Sealant.
(b) Sika:
(1) Primer: Primer: Sikasil Primer-2100.
(2) Sikasil-728 NS Non-Sag Silicone Sealant.

9. Sealants At Concrete Paving:
a. Expansion Joints and Control Joints (as required in Section 32 1313):
1) Description:
(a) One component (part) self-leveling silicon material that cures to ultra-low modulus silicone rubber upon exposure to atmospheric moisture.

(b) Cured silicone rubber remains flexible over entire temperature range expected in pavement applications.

2) Design Criteria:
   (a) Sealant is required at approved layout locations.
   (b) Meet following standards for Sealant: Self-leveling: ASTM C920, Type S, Grade P, Class 100/50; Use T.
3) Approved Products. See Section 01 6000:
   (a) Dow Corning:
      (1) Primer: 1200 Prime Coat.
      (2) Sealant: 890-SL Silicone Building Sealant.
   (b) Sika:
      (1) Primer: Primer: Sikasil Primer-2100.
      (2) Sealant: Sikasil-728 SL Self-leveling Silicone Sealant.

10. Sealants At Precast Concrete Cap and Joint Covers (if Contractor Option ONE was selected in Section 03 4500):
    a. Description:
       1) Soft lead strip, when set and bedded in sealant, form cap which assures permanent elastic seal for any masonry joint as specified in Section 03 4500.
    b. Design Criteria:
       1) Meet following standards for Sealant:
          (a) ASTM C920: Type S, Grade NS, Class 50 Use A, G, M.
          (b) Strips should be of sufficient size to cover the joint width, plus percentage allowance for anticipated joint movement, plus 1/4 inch (6.4 mm).
    c. Approved Products. See Section 01 6000:
       1) Dow Corning:
          (a) Primer: 1200 Prime Coat.
          (b) Sealant: 791 Silicone Weatherproofing Sealant.
       2) Momentive Performance Materials (formerly, GE Sealants & Adhesives):
          (a) Primer: SS4044 Primer.
          (b) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.
       3) Sika:
          (a) Primer: Sikasil Primer-2100.
          (b) Sealant: Sikasil-728 NS Non-Sag Silicone Sealant.
       4) Tremco:
          (a) Primer:
             (1) Metal surface: No. 20 primer.
             (2) Porous surfaces: No. 23 primer.
          (b) Sealant: Spectrum 1 Silicone Sealant.

11. General Interior Sealants:
    a. General:
       1) Inside jambs and heads of exterior door frames.
       2) Both sides of interior door frames.
       3) Inside perimeters of windows.
       4) Miscellaneous gaps between substrates.
    b. Design Criteria:
       1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
       2) 100 percent silicone sealant.
    c. VOC Content of Interior Sealants:
       1) Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
          (a) Architectural Sealants: 250 g/L.
          (b) Sealant Primers for Nonporous Substrates: 250 g/L.

(c) Sealant Primers for Porous Substrates: 775 g/L.

d. Non-Paintable Sealant (Installer Option A):
1) Approved Product. See Section 01 6000:
(a) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
(b) Laticrete: Latasil Silicone Sealant.
(c) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS2800 SilGlaze II Silicone Sealant.
(d) Sherwin Williams: White Lightning Silicone Ultra Low Odor Window and Door Sealant.
(e) Tremco: Tremsil 200 Silicone Sealant.
(f) Franklin International: Titebond 2601 (White) 2611 (Clear) 100% Silicone Sealant.

e. Paintable Sealant (Installer Option B):
1) Approved Product. See Section 01 6000:
(a) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS7000 Paintable Silicone Sealant.

12. Sealants For Interior Joints:
a. General:
1) Countertops and backsplash to wall.
2) Sinks and lavatories to countertops.
3) Joints between plumbing fixtures and other substrates.

b. Interior Ceramic Tile Joints are furnished in Section 07 9200 and installed in Section 09 3000 - Tiling including the following:
1) Ceramic tile inside corners.
2) Ceramic tile and paver tile joints.
3) Termination joints in font.
4) Termination joints in showers and font.

c. Description:
1) One-part acetoxy cure silicone sealant with fungicides to resist mold and mildew.

d. Design Criteria:
1) Meet ASTM C920, Type S, Grade NS, NT, and Class 25 test requirements.
2) 100 percent silicone sealant.

e. VOC Content of Interior Sealants:
1) Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
(a) Architectural Sealants: 250 g/L.
(b) Sealant Primers for Nonporous Substrates: 250 g/L.
(c) Sealant Primers for Porous Substrates: 775 g/L.

f. Color: As selected by Architect from Manufacturer's standard colors.

g. Approved Products. See Section 01 6000:
1) Dow Corning: Tub, Tile, And Ceramic Silicone Sealant.
2) Laticrete: Latasil Tile and Stone Silicone Sealant.
3) Momentive Performance Materials (formerly, GE Sealants & Adhesives): GE SCS1700 Sanitary Silicone Sealant.
4) Tremco: Tremsil 200 Silicone Sealant.

C. Acoustical Joint Sealants:
1. Design Criteria:
a. Meet requirements of ASTM C834.
b. Meet Class A flame spread rating.
2. Approved Products. See Section 01 6000:

a. OSI Pro-Series SC-175 Draft & Acoustical Sound Sealant by OSI Sealants Inc, Mentor, OH www.osisealants.com.
b. QuietZone Acoustic Caulk by Owens Corning, Toledo, OH www.owenscorning.com.
c. Acoustical Sealant by Tremco, Beachwood, OH www.tremcosealants.com or Toronto, ON (800) 363-3213.
d. Acoustical Sound Sealant by Titebond.
e. Acoustical Sealant by U S Gypsum, Chicago, IL www.usg.com.

2.02 ACCESSORIES

A. Bond Breaker Tape:
1. Pressure sensitive tape as by Sealant Manufacturer to suit application.
2. Provide tape to prevent adhesion to joint fillers or joint surfaces at back of joint and allow sealant movement.

B. Joint Backing:
1. Comply with ASTM C1330.
2. Flexible closed cell, non-gassing polyurethane or polyolefin rod or bond breaker tape as recommended by Sealant Manufacturer for joints being sealed.
3. Oversized 25 to 50 percent larger than joint width.

C. Joint Cleaner:
1. Non-corrosive and non-staining type as recommended by Sealant Manufacturer, compatible with joint forming materials.

D. Masking Tape:
1. Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification Of Conditions:
1. Examine substrate surfaces and joint openings are ready to receive Work.
a. Verify each sealant is compatible for use with joint substrates.
b. Verify joint surfaces are clean and dry.
c. Ensure concrete surfaces are fully cured.
2. Sealants provided shall meet Manufacturer's shelf-life requirements.
3. Notify Architect of unsuitable conditions in writing.
a. Do not proceed until unsatisfactory conditions are corrected.
4. Commencement of Work by installer is considered acceptance of substrate.

3.02 PREPARATION

A. Surface Preparation:
1. Surfaces shall be clean, dry, free of dust, oil, grease, dew, frost or incompatible sealers, paints or coatings that may interfere with adhesion. Prepare substrates in accordance with Manufacturer’s instructions:
a. Porous surfaces: Clean by mechanical methods to expose sound surface free of contamination and laitance followed by blasting with oil-free compressed air.
b. Nonporous surfaces: Use two-cloth solvent wipe in accordance with ASTM C1193. Allow solvent to evaporate prior to sealant application.
c. High-pressure water cleaning: Exercise care that water does not enter through failed joints.
d. Primers:
1) Primers enhance adhesion ability.
2) Use of primers is not a substitution for poor joint preparation.
3) Primers should be used always in horizontal application where there is ponding water.

2. Field test joints in inconspicuous location.
    a. Verify joint preparation and primer required to obtain optimum adhesion of sealants to joint substrate.
    b. When test indicates sealant adhesion failure, modify joint preparation primer, or both and retest until joint passes sealant adhesion test.
3. Masking: Apply masking tape as required to protect adjacent surfaces and to ensure straight bead line and facilitate cleaning.

B. Joints:
1. Prepare joints in accordance with ASTM C1193.
    a. Clean joint surfaces of contaminates capable of affecting sealant bond to joint surface using Manufacturer's recommended instructions for joint preparation methods.
    b. Remove dirt, dust, oils, wax, paints, and contamination capable of affecting primer and sealant bond.
    c. Clean concrete joint surfaces to remove curing agents and form release agents.

C. Protection:
1. Protect elements surrounding the Work of this section from damage or disfiguration.

3.03 APPLICATION

A. General:
1. Apply silicone sealant in accordance with Manufacturer's instructions.
2. Do not use damaged or deteriorated materials.
3. Install primer and sealants in accordance with ASTM C1193 and Manufacturer's instructions.
4. Apply primer where required for sealant adhesion.
5. Install sealants immediately after joint preparation.
6. Do not use silicone sealant as per the following:
    a. Apply caulking/sealant at temperatures below 40 deg F (4 deg C).
    b. Below-grade applications.
    c. Brass and copper surfaces.
    d. Materials bleeding oils, plasticizers, and solvents.
    e. Structural glazing and adhesive.
    f. Surfaces to be immersed in water for prolonged time.

B. Joint Backing:
1. Install joint backing to maintain sealant joint ratios recommended by Manufacturer.
2. Install without gaps, twisting, stretching, or puncturing backing material. Use gage to ensure uniform depth to achieve correct profile, coverage, and performance.
3. Rod for open joints shall be at least 1-1/2 times width of open joint and of thickness to give solid backing. Backing shall fill up joint so depth of sealant bite is no more than 3/8 inch (9.5 mm) deep.

C. Bond Breaker:
1. Install bond breaker where joint backing is not used or where backing is not feasible.
    a. Apply bond-breaker tape in shallow joints as recommended by Sealant Manufacturer.

D. Sealant:
1. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint. Apply sealants in vertical joints from bottom to top.
2. Fill joint opening to full and proper configuration.
3. Apply in continuous operation.
4. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface. Tool joints in opposite direction from application direction, i.e., in vertical joints, from the top down. Do not 'wet tool' sealants.

5. Depth of sealant bite shall be 1/4 inch (6 mm) minimum and 1/2 inch (12.7 mm) maximum, but never more than one half or less than one fourth joint width.

E. Install at perimeter joints and mechanical and electrical penetrations in sound insulated rooms. Apply sealant with hand-caulking gun with nozzle of proper size to fit joints. Use sufficient pressure to insure full contact to both sides of joint to full depth of joint.

F. Tool joints immediately after application of sealant if required to achieve full bedding to substrate or to achieve smooth sealant surface.

G. Caulk gaps between painted or coated substrates and unfinished or pre-finished substrates. Caulk gaps larger than 3/16 inch (5 mm) between painted or coated substrates.

3.04 TOLERANCES

A. Provide joint tolerances in accordance with Manufacturer's printed instructions.

3.05 FIELD QUALITY CONTROL

A. Inspection:
   1. Examine sealant joints to verify compliance with Contract Document requirements.

B. Non-Conforming Work. Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Sealant material found to be contaminated or damaged or inadequate preparation of substrate results in deficiencies in joint sealant adhesion is considered defective or not complying with Contract Document requirements.
   2. Correct any work found defective or not-complying with Contract Document requirements at no additional cost to Owner.

C. Adhesion Test (Installer Option to use adhesion test to determine if primer is required).
   1. Perform adhesion tests in accordance with Manufacturer's instructions and ASTM C1193, Method A, Field-Applied Sealant joint Hand-Pull Tab:
      a. Perform five (5) tests for first 1,000 linear feet (300 meters) of applied silicone sealant and one (1) test for each 1,000 linear feet (300 meters) seal thereafter or perform one (1) test per floor per building elevation minimum.
      b. For sealants applied between dissimilar materials, test both sides of joints.
   2. Sealants failing adhesion test shall be removed, substrates cleaned, sealants re-installed, and re-testing performed.
   3. Maintain test log and submit report to Architect indicating tests, locations, dates, results, and remedial actions.

3.06 CLEANING

A. Remove sealant from adjacent surfaces in accordance with Sealant Manufacturer and Substrate Manufacturer recommendations as work progresses.

B. Remove masking tape and excess sealant.

C. Clean adjacent materials, which have been soiled, immediately (before setting) as recommended by Manufacturer.

D. Waste Management: Dispose of products in accordance with manufacturer's recommendation.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Materials for backpriming woodwork.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Ceramic and other tiles.
   9. Brick, architectural concrete, cast stone, integrally colored plaster, and stucco.
   10. Glass.
   11. Concrete masonry units in utility, mechanical, and electrical spaces.
   12. Acoustical materials, unless specifically indicated.
   13. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2019.

B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.

C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Schedule painting pre-installation conference after delivery of paint or coatings and before or at same time as application of field samples.
      a. Coordinate pre-installation conferences of all related painting and coating Sections under 09 9000 heading ‘Paints and Coatings’.
      b. Schedule conference before preparation of control samples as specified in Sections under 09 9000 heading ‘Paints and Coatings’.
      c. Conference to be held at same time as Section 09 2116 to review gypsum board finish preparation.
   2. In addition to agenda items specified in Section 01 3000, review following:
      a. Review Quality Assurance for Approval requirements.
      b. Review Quality Assurance Field Sample requirements.
      c. Review Submittal requirements for compliance for MPI Approved Products.
      d. Review Design Criteria requirements.
      e. Review Cleaning requirements.
      f. Review painting schedule.

g. Review safety issues.

3. Review additional agenda items from Sections under 09 9000 heading ‘Paints and Coatings’.

1.05 SUBMITTALS

A. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
   2. MPI product number (e.g., MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.

B. Samples: Submit two paper "draw down" samples, 4 x 6 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, submit each color in each sheen available.

C. Closeout Submittals:
   1. Include following in Operations and Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Manufacturer’s documentation:
            (a) Manufacturer's cut sheet for each component of each system.
            (b) Schedule showing rooms and surfaces where each system was used.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience and approved by manufacturer.
   1. Minimum five (5) satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding.
   2. Maintain qualified crew of painters throughout duration of the Work.
   3. Upon request, submit documentation.

1.07 MOCK-UP

A. Before application of any paint system, meet on Project site with Architect, Owner's representative, and Manufacturer's representative. Architect may select one (1) surface for application of each paint system specified. This process will include establishing acceptable substrate conditions required for Project before application of paints and coatings.

B. Apply paint systems to surfaces indicated by Architect following procedures outlined in Contract Documents and Product Data submission specified above.

C. After approval of samples, proceed with application of paint system throughout Project. Approved samples will serve as standard of acceptability.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

PART 2 PRODUCTS

2.01 PERFORMANCE AND DESIGN CRITERIA

A. Regulatory Agency Sustainability Approval:

1. Conform to work place safety regulations and requirements of those authorities having jurisdiction for storage, mixing, application and disposal of all paint and related hazardous materials.
2. Paint and painting materials shall be free of lead and mercury, and have VOC levels acceptable to local jurisdiction.
3. Master Painters Institute (MPI) Standards:
    a. Products: Comply with MPI standards indicated and listed in 'MPI Approved Products List'.
    b. Preparation and Workmanship: Comply with requirements in 'MPI Architectural Painting Specification Manual' for products and coatings indicated.

2.02 MANUFACTURERS

A. Provide products indicated from one of the following. Alternate products must be approved by Architect prior to bid. Alternate products must meet specified criteria and be listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
    1. Benjamin Moore and Company: www.benjaminmoore.com.
        a. National Account Representative: Doug Summers, Doug.Summers@Benjaminmoore.com , (801) 721-6380
            1) Open Job Account: Preferred for projects greater than $10,000. Link to Church Parent Account #10020025
            2) Cash Only Account: #10020025 - pay at purchase.
    2. PPG Industries: www.ppgpaints.com
        a. Specification and design Representative: Ryan Henrie, rhenrie@ppg.com, (435)817-3011. Corporate Account Manager: Vito Anteri, vfanteri@ppg.com (480) 6665-9769.
            1) Open Job Account: Preferred for projects greater than $10,000. Link to Church Parent Account #CRCHLTTR.
            2) Cash Only Account: #CRCHLTTR - pay at purchase.
    3. Sherwin-Williams Company: www.sherwin-willams.com.
        a. National Account Representative: Mike Koncilja, mike.k@sherwin.com , Account Representative: Todd W. Taylor, todd.w.taylor@sherwin.com , Architectural Account Executive: Richard Condie, Richard.condie@sherwin.com .
            1) Open Job Account: Preferred for projects greater than $10,000. Link to Church Parent Account #3692
            2) Cash Only Account: #302276043 – pay at purchase.
    4. Contact Account Representative before acquiring paint to ensure required acquistion process is followed.

2.03 PAINTS AND FINISHES - GENERAL

A. Ready-mixed, unless intended to be a field-catalyzed paint.
    1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
    2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
    3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
    4. Supply each paint material in quantity required to complete entire project's work from a single production run.
    5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

2.04 PAINT SYSTEMS - INTERIOR

A. Interior Poured Concrete:

1. Materials:
   a. MPI Product 60" 'Floor Paint, Latex, Low Gloss' (or):
      1) N122 Floor & Patio Low Sheen Enamel Floor Coating by Benjamin Moore
      2) 3-510XI Series PPG Floor & Porch Enamel Interior/Exterior 100% Acrylic Latex Satin
      3) B90A102 Armorseal Tread Plex Water Based Acrylic Floor Coating by Sherwin Williams
2. Performance:
   a. Design Criteria:
      1) Gloss / Sheen Level Required: Semi-Gloss.
   b. New Surfaces: Use MPI(a) INT 3.2A Latex Finish system (or products listed above).
   c. Previously Finished Surfaces: Use MPI(r) RIN 3.2A Latex Finish system (or products listed above).
   d. Finish Requirements: Use MPI Custom Grade finish requirements.

B. Interior Gypsum Board and Plaster:
1. Materials:
   a. Primers:
      1) MPI Product 50, 'Primer Sealer, Latex, Interior' (or):
         (a) 354 Super Hide® Zero VOC Interior Latex Primer by Benjamin Moore.
         (b) 6-4900xi PPG Speedhide Zero Interior Latex Primer by PPG Paints.
         (c) B28W02600 ProMar 200 Zero Interior Latex Primer by Sherwin Williams.
   b. Finish Coats:
      1) Rest Rooms And Custodial Rooms:
         (a) Buildings with only Gypsum Board surfaces in rooms:
         (b) MPI Product 115, 'Epoxy-Modified Latex, Interior, Gloss (MPI Gloss Level 6)' (or):
            (1) V341 Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss by Benjamin Moore.
            (2) Aquapon WB EP 98E-X/98E-98 Waterborne Catalyzed Semi-Gloss Epoxy by PPG Paints.
            (3) B73W311 Pro Industrial Waterbased Catalyzed Epoxy by Sherwin Williams.
         (c) Buildings with CMU and Gypsum Board surfaces in same rooms:
         (d) MPI Product 77, 'Epoxy, Gloss' (or):
            (1) V341 Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss by Benjamin Moore.
            (2) Aquapon WB EP 98E-X/98E-98 Waterborne Catalyzed Semi-Gloss Epoxy by PPG Paints.
            (3) B73W311 Pro Industrial Waterbased Catalyzed Epoxy by Sherwin Williams.
      2) Remaining Painted Surfaces:
         (a) Walls/Partitions/Vertical Surfaces - MPI Product 141, 'Latex, Interior, High Performance Architectural, Semi-Gloss (MPI Gloss Level 5)' (or):
            (1) 358 Super Hide® Zero VOC Interior Semi-Gloss by Benjamin Moore.
            (2) 6-5510 PPG Speedhide Zero Interior Latex Semi-Gloss by PPG Paints.
            (3) ProMar 200 Zero VOC HP Latex Semi-Gloss by Sherwin Williams.
         (b) Ceilings - MPI Product 143 'Latex, Interior, High Performance Architectural, Flat (MPI Gloss Level 1 or 2)' (or):
            (1) Waterborne Ceiling Paint Ultra Flat 508 by Benjamin Moore.
            (2) 6-4110xi PPG Speedhide Zero Interior Latex Flat by PPG Paints.
            (3) ProMar 200 Zero VOC Interior Latex Flat by Sherwin Williams.
2. Performance:

a. Design Criteria:
    1) New Surfaces: MPI Premium Grade finish requirements.
    2) Gloss / Sheen Required:
        (a) Rest Rooms And Custodial Rooms: Gloss Level 6.
        (b) Remaining Painted Surfaces: Gloss Level 5.
b. Rest Rooms And Custodial Rooms:
    1) New Surfaces: Use MPI(a) INT 9.2E Waterborne Epoxy Finish system (or products listed above).
c. All Other:
    1) New Surfaces: Use MPI(a) INT 9.2B Latex Finish system (or products listed above).

C. Interior Metal:
1. Materials:
    a. Primers:
        1) Ferrous Metal: MPI Product 107, 'Primer, Rust-Inhibitive, Water Based' (or):
            (a) HP04 Ultra Spec HP Acrylic Metal Primer by Benjamin Moore.
            (b) PPG Pitt-Tech Plus 4020PF / 90-19XX series Waterborne Acrylic Primer/Finish by PPG Paints.
            (c) Pro-Cryl Universal Primer by Sherwin Williams.
        2) Galvanized Metal: MPI Product 134: 'Primer, Galvanized, Water Based' (or):
            (a) HP04 Ultra Spec HP Acrylic Metal Primer by Benjamin Moore.
            (b) PPG Pitt-Tech Plus 4020PF / 90-19XX series Waterborne Acrylic Primer/Finish by PPG Paints.
            (c) Pro-Cryl Universal Primer by Sherwin Williams.
        3) Aluminum: MPI Product 134: 'Primer, Quick Dry, for Aluminum' (or):
            (a) HP04 Ultra Spec HP Acrylic Metal Primer by Benjamin Moore.
            (b) PPG Pitt-Tech Plus 4020PF / 90-19XX series Waterborne Acrylic Primer/Finish by PPG Paints.
            (c) Pro-Cryl Universal Primer by Sherwin Williams.
    b. Finish Coats: MPI Product 153: 'Light Industrial Coating, Interior, Water Based, Semi-Gloss (MPI Gloss Level 5)' (or):
        1) V341 Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss by Benjamin Moore.
        2) 16-1510 PPG Pitt-Glaze WB1 Waterborne Pre-Catalyzed Semi-Gloss Epoxy by PPG Paints.
        3) B73W311 Pro Industrial Waterbased Catalyzed Epoxy by Sherwin Williams.
2. Performance:
    a. Design Requirements:
        1) New Surfaces: MPI Premium Grade finish requirements.
        2) Deteriorated Existing Surfaces: MPI Premium Grade finish requirements.
        3) Sound Existing Surfaces: MPI Custom Grade finish requirements.
        4) Gloss / Sheen Level Required: Gloss Level 5.
    b. Ferrous Metal:
        1) New Surfaces: Use MPI(a) INT 5.1B Waterborne Light Industrial Finish system (or products listed above).
        2) Previously Finished Surfaces: Use MPI(r) RIN 5.1B Waterborne Light Industrial Finish system (or products listed above).
    c. Galvanized Metal:
        1) New Surfaces: Use MPI(a) INT 5.3J Latex Finish system (or products listed above).
        2) Previously Finished Surfaces: Use MPI(r) RIN 5.3AH Latex Finish system (or products listed above).
    d. Aluminum:

1) New Surfaces: Use MPI(a) INT 5.4E Waterborne Light Industrial Finish system (or products listed above).
2) Previously Finished Surfaces: Use MPI(r) REX 5.4E Light Industrial Finish system (or products listed above).

D. Locations indicated as Epoxy:
1. Materials
a. Wall and Ceiling Surfacing System:
1) Interior Primer:
(a) Approved Product. See Section 01 6000:
(b) Multi-Purpose Primer 067 by Benjamin Moore
(c) 6-4 PPG Speedhide MaxPrime High Build Interior Latex Primer/Surfacer by PPG Paints.
(d) B28W601 PrepRite High Build Interior Latex Primer/Surfacer by Sherwin-Williams.
2) Epoxy:
(a) Color: White.
(b) Approved Product. See Section 01 6000:
(c) V341 Corotech Pre-Catalyzed Waterborne Epoxy Semi-Gloss by Benjamin Moore.
(d) 16-1510 PPG Pitt-Glaze WB1 Waterborne Pre-Catalyzed Semi-Gloss Epoxy by PPG Paints.
(e) K45 Series Pro Industrial Pre-Catalyzed Epoxy by Sherwin-Williams.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been adequately prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

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

3.02 PREPARATION

A. Protection of In-Place Conditions:
1. Protect other finish work and adjacent materials during painting. Do not splatter, drip, or paint surfaces not intended to be painted. These items will not be spelled out in detail but pay special attention to the following:
a. Do not paint finish copper, bronze, chromium plate, nickel, stainless steel, anodized aluminum, or monel metal except as explicitly specified.
b. Keep cones of ceiling speakers completely free of paint. In all cases where painting of metal speaker grilles is required, paint without grilles mounted to speakers and without grilles on ceiling.

B. Surface Preparation:
1. Prepare surfaces in accordance with MPI requirements and requirements of Manufacturer for each painting system specified, unless instructed differently in Contract Documents. Bring conflicts to attention of Architect in writing.
2. Fill minor holes and cracks in wood surfaces to receive paint or stain.
3. Surfaces to be painted shall be clean and free of loose dirt. Clean and dust surfaces before painting or finishing.
4. Do no exterior painting while surface is damp, unless recommended by Manufacturer, nor during rainy or frosty weather. Interior surfaces shall be dry before painting. Moisture content of materials to be painted shall be within tolerances acceptable to Paint Manufacturer.

5. Sand woodwork smooth in direction of grain leaving no sanding marks. Clean surfaces before proceeding with stain or first coat application.

C. Clean surfaces thoroughly and correct defects prior to application.

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

E. Remove or repair existing paints or finishes that exhibit surface defects.

F. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

G. Seal surfaces that might cause bleed through or staining of topcoat.

H. Interior Poured Concrete:
   1. New Surfaces:
      a. Prep according to manufacturer's instructions.
      b. Apply prime coat.
      c. Apply finish coats.
   2. Existing Painted Surfaces:
      a. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Acid etch bare concrete areas, if necessary.
      b. Clean floors as recommended by Paint Manufacturer.
      c. Apply coating system.

I. Interior Gypsum Board and Plaster:
   1. Interface With Other Work: Properly clean and paint light cove interiors before installation of light fixtures.
   2. New Surfaces:
      a. Primer: Apply primer to be covered with other paint coats with roller only, or with spray gun and back-rolled.
   3. Existing Painted Surfaces:
      a. Remove deteriorated existing paint down to sound substrate by scraping or sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces.
      b. Clean surface with mild soap and water, or with tri-sodium phosphate (TSP). Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
      c. Spackle and tape cracks. Sand to smooth finish and spot prime.
      d. Sand or chemically etch existing painted surface as required to prepare surface to accept new paint.
      e. Re-clean surface.
      f. Apply primer coat.
      g. Apply finish coats.

J. Interior Metal:
   1. New Surfaces: Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.
   2. Existing Painted Surfaces:
      a. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Spot prime bare metal surfaces immediately.
      b. Remove rust spots by sanding and immediately spot prime. If all traces of rust cannot be removed, apply rust blocker recommended by Paint Manufacturer before applying full primer coat.
      c. Clean existing sound painted surfaces as well as scraped and sanded existing painted surfaces as recommended by Paint Manufacturer.

d. Apply prime coat over entire surface to be painted.
e. Lightly sand entire surface.
f. Clean surface as recommended by Paint Manufacturer.
g. Apply finish coats.

K. Interior Wood:
1. New Surfaces:
a. Spot prime nail holes, cracks, and blemishes before and after puttying.
b. Apply stain blocker or other product recommended by Paint Manufacturer to knots before applying primer coat.
2. Existing Painted Surfaces:
a. Remove deteriorated existing paint down to sound substrate by scraping and sanding. Feather edges of existing paint by sanding to be smooth with adjacent surfaces. Spot prime bare wood areas on woodwork.
b. Wash surfaces that have been defaced with marking pens, crayons, lipstick, etc, with solvent recommended by Paint Manufacturer. Spot prime such surfaces.
c. Apply finish coats.

3.03 APPLICATION

A. Interface with Other Work:
1. Coordinate with other trades for materials and systems that require painting before installation.
2. Schedule painting and coating work to begin when work upon which painting and coating work is dependent has been completed. Schedule installation of pre-finished and non-painted items, which are to be installed on painted surfaces, after application of final finishes.

B. Paint or finish complete all surfaces to be painted or coated as described in Contract Documents, including but not limited to following items.

C. Apply sealant in gaps 3/16 inch (5 mm) and smaller between two substrates that are both to be painted or coated. Sealants in other gaps furnished and installed under Section 07 9200.

D. On wood to receive a transparent finish, putty nail holes in wood after application of stain using natural colored type to match wood stain color. Bring putty flush with adjoining surfaces.

E. In multiple coat paint work, tint each succeeding coat with slightly lighter color, but approximating shade of final coat, so it is possible to check application of specified number of coats. Tint final coat to required color.

F. Spread materials smoothly and evenly. Apply coats to not less than wet and dry film thicknesses and at spreading rates for specified products as recommended by Manufacturer.

G. Touch up suction spots after application of first finish coat.

H. Paint shall be thoroughly dry and surfaces clean before applying succeeding coats.

I. Use fine sandpaper between coats as necessary to produce even, smooth surfaces.

J. Make edges of paint adjoining other materials or colors clean, sharp, and without overlapping.

K. Finished work shall be a 'Properly Painted Surface' as defined in this Section.
1. Finish casework and wood trims that are specified to be installed under Section 06 2000 and that are not called out to be factory-or shop-finished. Back prime wood elements to be installed against concrete or masonry or that may be subjected to moisture.
2. Paint mechanical, electrical, and audio/visual items that require field painting as indicated in Contract Documents. These include but are not limited to:
a. Gas pipe from gas meter into building.
b. Mechanical flues and pipes penetrating roof.
c. Electrical panel and disconnect enclosures.
d. Metal protective structures for refrigerant lines.
3. Metal reveals at ceiling access doors.

4. Paint inside of chases in occupied spaces flat black for 18 inches (450 mm) or beyond sightline, whichever is greater.
5. Paint surfaces in organ chamber behind grille cloth with flat black paint.

L. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

M. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

N. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

O. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

P. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

Q. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

R. Sand wood and metal surfaces lightly between coats to achieve required finish.

S. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

T. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

B. Owner will provide field inspection.

C. Non-Conforming Work:
1. Correct deficiencies in workmanship as required to leave surfaces in conformance with 'Properly Painted Surface,' as defined in this Section.
2. Correction of 'Latent Damage' and 'Damage Caused By Others,' as defined in this Section, is not included in work of this Section.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. As work proceeds and upon completion of work of any painting Section, remove paint spots from floors, walls, glass, or other surfaces and leave work clean, orderly, and in acceptable condition.

C. Waste Management:
1. Remove rags and waste used in painting operations from building each night. Take every precaution to avoid danger of fire.
2. Paint, stain and wood preservative finishes and related materials (thinners, solvents, caulking, empty paint cans, cleaning rags, etc.) shall be disposed of subject to regulations of applicable authorities having jurisdiction.
3. Remove debris caused by work of paint Sections from premises and properly dispose.
4. Retain cleaning water and filter out and properly dispose of sediments.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.07 SCHEDULE OF PAINT COLORS

A. Interior:
1. Interior Poured Concrete (See Section 09 9123):
a. Color Quality Standard. See Section 01 6000:

1) [Insert Product and Color] by [Insert Manufacturer].

2. Interior Clear Finished Wood (See Section 09 9300):
   a. Match other interior clear finished wood building elements.
3. Interior Gypsum Board, Plaster (See Section 09 9123):
   a. Color Quality Standard. See Section 01 6000:
      1) Cherry / Blue: SW6070 by Sherwin Williams or PPG 1021-1 Mountain Gray by PPG Paints or 961 Seapearl by Benjamin Moore.
      2) Cherry / Green: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      3) Cherry / Red: SW6070 by Sherwin Williams or PPG 1021-1 Mountain Gray by PPG Paints or 961 Seapearl by Benjamin Moore.
      4) OAK 95 / Blue: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      5) OAK 95 / Green: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      6) OAK 95 / Red: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
4. Interior Metal (See Section 09 9123):
   a. Color Quality Standard. See Section 01 6000:
      1) Cherry / Blue: SW6070 by Sherwin Williams or PPG 1021-1 Mountain Gray by PPG Paints or 961 Seapearl by Benjamin Moore.
      2) Cherry / Green: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      3) Cherry / Red: SW6070 by Sherwin Williams or PPG 1021-1 Mountain Gray by PPG Paints or 961 Seapearl by Benjamin Moore.
      4) OAK 95 / Blue: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      5) OAK 95 / Green: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      6) OAK 95 / Red: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
5. Interior Painted Wood (See Section 09 9123):
   a. Color Quality Standard. See Section 01 6000:
      1) Cherry / Blue: SW6070 by Sherwin Williams or PPG 1021-1 Mountain Gray by PPG Paints or 961 Seapearl by Benjamin Moore.
      2) Cherry / Green: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      3) Cherry / Red: SW6070 by Sherwin Williams or PPG 1021-1 Mountain Gray by PPG Paints or 961 Seapearl by Benjamin Moore.
      4) OAK 95 / Blue: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      5) OAK 95 / Green: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.
      6) OAK 95 / Red: SW6098 by Sherwin Williams or PPG 1078-2 Water Chestnut by PPG Paints or OC-142 Sail Cloth by Benjamin Moore.

END OF SECTION 09 9123

SECTION 31 2323
FILL AND AGGREGATE BASE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for building volume below grade, footings, slabs-on-grade, paving, and utilities within the building.

B. Backfilling and compacting for utilities outside the building to utility main connections.

C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

D. Lightweight (Flowable) concrete fill (option for backfilling of piping systems and other utilities)

E. Aggregate Base:

1.02 RELATED REQUIREMENTS

A. Section 31 0519 - Geosynthetics for Earthwork.

B. Section 31 0500 - Common Earthwork Requirements

C. Section 31 1000 - Site Clearing

D. Section 31 2200 - Grading: Removal and handling of soil to be re-used.

E. Section 31 2200 - Grading: Site grading.

F. Section 31 2316 - Excavation and Trenching: Removal and handling of soil to be re-used.

G. Section 31 3116 - Termite Control

H. Section 32 1216 - Asphalt Paving

I. Section 32 1213 - Concrete Paving

J. Section 33 4100 - Subdrainage: Filter aggregate and filter fabric for foundation drainage systems.

K. Division 32 - Exterior Improvements

1.03 REFERENCE STANDARDS

A. ASTM C150/C150M - Standard Specification for Portland Cement 2022.

B. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.

C. ASTM C796/C796M - Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam 2019.

D. ASTM D1883 - Standard Test Method for California Bearing Ratio (CBR) of Laboratory-Compacted Soils 2016.

E. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System) 2017, with Editorial Revision (2020).

F. ASTM D6817/D6817M - Standard Specification for Rigid Cellular Polystyrene Geofoam 2017 (Reapproved 2021).

G. ASTM D7557/D7557M - Standard Practice for Sampling of Expanded Polystyrene Geofoam Specimens 2009 (Reapproved 2021).

H. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.

1.04 DEFINITIONS

A. Lightweight (Flowable) Concrete Fill::
   1. Self-leveling and self-compacting, cementitious material.
   2. Unconfined compressive strength of less than 150 psi.

3. Cementitious slurry consisting of mixture of fine aggregate of filler, water and cementitious materials, which is used as fill or backfill in lieu of compacted earth. This material is capable of filling all voids in irregular excavations and hard to reach places (such as under undercuts of existing slabs), is self-leveling, and hardens in a matter of a few hours without need for compacting in layers. Lightweight (Flowable) concrete fill is sometimes referred to as excavatable flowable fill, controlled density fill , controlled low strength material, lean concrete slurry, and unshrinkable fill. Flowable fill is not concreter nor used to replace concrete. it is intended to contain low cementitious content for reduced strength development.

B. Reclaimed Asphalt Pavement (RAP): Existing asphalt mixture that has been pulverized, usually by milling, and is used like an aggregate in recycling of asphalt pavements.

1.05 SUBMITTALS

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

B. Mix design for Lightweight (Flowable) Concrete Fill.

C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

D. Compaction Density Test Reports.

E. Lightweight (Flowable) Concrete Fill Test Reports.

F. Testing Agency Qualification Statement.

1.06 ADMINISTRATIVE REQUIREMENTS

A. Participate in pre-installation meeting as specified in Section 31 0500.

1.07 QUALITY ASSURANCE

A. Testing and Inspection:
   1. Owner will provide Testing and Inspection for fill and aggregate base:
      a. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
   2. Owner will employ testing agencies to perform testing and inspection for aggregate base as specified in Field Quality Control in Part 3 of this specification.
      a. Owner’s employment of an independent Testing Agency does not relieve Contractor of Contractor’s obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.

B. Designer Qualifications: Perform design of structural fill under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

D. Scheduling:
   1. Allow special inspector to review all subgrades and excavations to determine if site has been prepared in accordance with geotechnical evaluation report prior to placing any fill or aggregate base (or concrete).
   2. Notify Testing Agency and Architect seventy-two (72) hours minimum before installation of fill or aggregate base to perform proctor and plasticity index tests on proposed fill, aggregate base or subgrade.
   3. Notify Testing Agency and Architect twenty-four (24) hours minimum before installation of fill or aggregate base to allow inspection.
   4. Allow Inspection and Testing Agency to inspect and test subgrades and each fill and aggregate base layer. Proceed with subsequent earthwork only after inspections and test results for prior compacted work comply with requirements.
   5. Interior slab-on-grade concrete:

a. Notify Architect twenty-four (24) hours minimum before installation of concrete to allow inspection of vapor retarder installation.
b. Notify Testing Agency and Architect twenty-four (24) hours minimum before installation of interior concrete slabs to allow inspection of aggregate base.
c. Allow special inspector to review all subgrades and excavations to determine if building pad has been prepared in accordance with geotechnical report prior to placing any aggregate base.

6. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing concrete for exterior site work concrete (sidewalks, curbs, gutters), footings, foundation walls, and building slabs to allow inspection of aggregate base.
7. Paving:
   a. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing aggregate base to allow inspection of aggregate base.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill - Fill Type: Subsoil excavated on-site.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
   3. Complying with ASTM D2487 Group Symbol CL.

B. Fill:
   1. Well graded material conforming to ASTM D2487 free from debris, organic material, frozen materials, brick, lime, concrete, and other material which would prevent adequate performance of backfill.
      a. Under Building Footprint And Paved Areas: Fill shall comply with soil classification groups GW, CL, GP, GM, SW, SP, or SM. Fill may not contain stones over 6 inches diameter and ninety-five (95) percent minimum of fill shall be smaller than 1-1/2 inch in any direction.
      b. Under Landscaped Areas:
         1) Fill more than 36 inches below finish grade shall comply with soil classification groups GW, CL, GP, GM, SW, SP, or SM. Fill may not contain stones over 6 inches (150 mm) diameter and ninety (90) percent minimum of fill shall be smaller than 1-1/2 inch in any direction.
         2) Fill less than 36 inches below finish grade shall comply with soil classification groups SW, SP, SM, or SC. Fill may not contain stones larger than 1-1/2 inches in any direction and ninety (90) percent minimum of fill shall be smaller than 3/8 inch in any direction.

C. Engineered Fill:
   1. Structural Fill - Fill Type: Subsoil excavated on-site.
      a. Graded.
      b. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
      c. Complying with ASTM D2487 Group Symbol CL.

D. Lightweight (Flowable) Concrete Fill:
   1. Finished Properties, Class II Engineered Fill:
      a. Cast Density, Maximum: 30 pounds per cubic foot.
      b. Compressive Strength, Minimum: 41 pounds per square inch.
   2. Materials:
      a. Cement: ASTM C150/C150M.
      b. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
      c. Admixtures: As recommended by lightweight (flowable) concrete fill manufacturer.
      d. Expansion Material: Manufacturer's recommended expansion material.
      e. Mix Design: By manufacturer.

E. Aggregate Base:

1. Under Exterior Concrete excluding Under Paving (sidewalks, curbs, gutters):
   a. New Aggregate Base:
      1) Road Base to conform to State DOT Specifications.
2. Under Exterior Mow Strips:
   a. 3/4 inch gravel.
3. Under Paving:
   a. New Aggregate Base:
      1) Road Base to conform to 1-1/2 inches minus State DOT Specifications and Gradations.
      2) Aggregate base shall be non-plastic.
   b. Reclaimed Asphalt and Concrete Pavement (RAP):
      1) Pulverized Portland or asphalt concrete paving mixed uniformly with existing aggregate base.
      2) Conform to following gradation:
         (a) Sieve Percent of Weight Passing
            (1) 2 inch (50.0 mm) 100
            (2) 1 1/2 inch (38.0 mm) 85 - 100
            (3) 3/4 inch (19.0 mm) 60 - 80
            (4) No. 4 (4.750 mm) 30 - 50
            (5) No. 200 (0.075 mm) 5 - 12
      3) Quality Requirements as established by testing:
         (a) R-value (CBR value as per ASTM D1883): 70 percent minimum.
      4) Sand Equivalent (ASTM D2419): 25 percent minimum.
      5) ASTM C131/C131M (Los Angeles Abrasion): 50 percent maximum.
         (a) ASTM D4318 (Atterberg Limits): Non-Plastic.
4. Under Interior Concrete Slab-On-Grade:
   a. New Aggregate Base:
      1) Gravel: 3/4 inch minimum to one inch maximum well-graded, clean gravel or crushed rock.
      2) Base type gravel or crushed rock, graded by weight (three-quarter to one-inch clean gap-graded gravel); road Base type gravel or crushed stone (slag not allowed). Conform to the following gradation:
         (a) Sieve Percent of Weight Passing
            (1) 2 inch (50.0 mm) 100
            (2) 1 1/2 inch (38.0 mm) 85 - 100
            (3) 1 inch (25.4 mm) 100
            (4) 3/4 inch (19.0 mm) 80 - 90
            (5) 1/2 inch (12.7 mm) 20 - 40
            (6) 3/8 inch (9.5 mm) 5 -10
            (7) No. 4 (4.750 mm) 0 12

F. SOURCE QUALITY CONTROL
   1. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
   2. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
   3. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
   1. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Before placing fill, aggregate base, or finish work, prepare existing subgrade as follows:
   1. Under Building Slab, Equipment Pad, Under Driveways, Parking, Under Miscellaneous Concrete Site Elements And Outside Face of Foundation Wall Areas:
      a. Do not place fill or aggregate base over frozen subgrade.
      b. Moisture condition to uniform moisture content of between optimum and four (4) percent over optimum, and mechanically compact 6 inches deep to ninety-five (95) percent minimum of relative compaction.
      c. Finish grade to grades required by Contract Documents.
   2. Landscape Areas:
      a. Compact subgrade to eight-five (85) percent relative compaction.

C. Aggregate Base:
   1. Do not perform work during unfavorable conditions as specified below:
      a. Presence of free surface water.
      b. Over-saturated sub base materials.

D. Vapor Retarder under Interior Concrete Slab-on-Grade:
   1. Unacceptable conditions for installation include presence of high winds which would tear or damage vapor retarder.

E. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

F. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 PERFORMANCE

A. Interface With Other Work:
   1. Section 31 2200 - Grading for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
   2. Section 31 2200 - Grading for grading of subgrade below aggregate base and topsoil.
   3. Do not place fill or aggregate base material when subgrade is frozen or unstable.
   4. Remove all standing water before placing fill or aggregate base material.

B. Fill:
   1. General:
      a. Do not fill against bituminous dampproofing to exterior of font foundation walls for twenty-four (24) hours after application of dampproofing.
      b. Before backfilling, show utility and service lines being covered on record set of Drawings. Do not backfill until utilities involved have been tested and approved by Architect and until instructed by Architect.
      c. Around Buildings And Structures: Slope grade away from building as specified unless noted otherwise in Contract Drawings. Hand backfill when close to building or where damage to building might result.
      d. Site Utilities:
         1) In Landscape Areas: Use backfill consisting of on-site soil.
         2) Under Pavement and Concrete Site Elements: Extend excavatable flowable fill/backfill to elevation of subgrade. Do not place aggregate base material until excavatable flowable fill/backfill has cured seventy-two hours.
      e. Do not use puddling or jetting to consolidate fill areas.

C. Compacting:
   1. Fill And Aggregate Base:
      a. Under Interior Concrete Slabs on Grade:
         1) Fill:
            (a) Place in 8 inch maximum uncompacted layers, moisture condition to plus or minus two (2) percent of optimum moisture content and mechanically

compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.

2) Aggregate Base:
   (a) Place 4 inches minimum of aggregate base under vapor retarder, level, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.
3) Vapor Retarder:
   (a) Install vapor retarder in accordance with ASTM E1643 except where Contract Documents indicate otherwise and following instructions:
      (1) Install vapor retarder over aggregate base over compacted subgrade so entire area under slab is covered.
      (2) Install vapor retarder in accordance with ASTM E1643 at interior stem walls.
   (b) Lap joints 6 inches (150 mm) minimum and seal with specified seam tape.
      (1) Seal vapor retarder around pipes, conduits, and other utility items that penetrate vapor retarder using factory-fabricated boot installed as recommended by Manufacturer.
      (2) Except for punctures required for reinforcing and anchor bolts at top of stem walls, seal tears and punctures.

b. Equipment Pad Areas:
   1) Fill:
      (a) Place in 8 inch maximum uncompacted layers, moisture condition to plus or minus two (2) percent of optimum moisture content and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.
   2) Aggregate Base:
      (a) Place 4 inches minimum of aggregate base, level, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.

c. Under Driveways, Truck Areas, And Parking Areas:
   1) Fill:
      (a) Place in 8 inch maximum uncompacted layers, dampen but do not soak, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1557.
   2) Aggregate Base:
      (a) Use 6 inches minimum aggregate base under paving for meetinghouse and CES projects, unless noted otherwise in Contract Drawings, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.
      (b) Use 8 inches minimum of aggregate base for Welfare Services Projects except use 12 inches minimum in truck areas, unless noted otherwise in Contract Drawings, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.
      (c) Priming: Prime aggregate base with application of 0.2 to 0.5 gallons (2 to 5 liters) of asphalt cement primer per square yard (meter) if pavement will be laid more than three days after compaction of aggregate base, or if precipitation is anticipated between completion of compaction of aggregate base and laying of asphalt paving.
      (d) Recompact unprimed aggregate base if it receives precipitation before pavement is laid.
      (e) Remove or repair improperly prepared areas as directed by Architect.

2. Under Miscellaneous Concrete Site Elements (sidewalks, curbs, gutters, not mow strips) And Outside Face of Foundation Walls:
   a. Fill:

1) Place in 8 inch maximum uncompacted layers, dampen but do not soak, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1557.

b. Aggregate Base:

1) Four inches minimum of aggregate base. Level, and mechanically compact to ninety-five (95) percent minimum of maximum laboratory density as established by ASTM D1157.

3. Under Exterior Mow Strips:

a. Aggregate Base:

1) 6 inches of 3/4 inch gravel.

4. Utility Trenches:

a. Site:

1) Fill:

(a) Place fill in 12 inch maximum uncompacted layers and moisture condition to plus or minus two (2) percent of optimum moisture content.

(b) Compact fill to ninety-five (95) percent minimum relative compaction to within 12 inches of finish grade.

(c) Compact fill above 12 inches to eight-five (85) percent relative compaction.

b. Under Miscellaneous Slabs:

1) Fill:

(a) Place in 6 inch maximum uncompacted layers, moisture condition to plus or minus two (2) percent of optimum moisture content, and compact to ninety-five (95) percent minimum relative compaction to within 4 inches of finish grade.

2) Aggregate Base:

(a) Place 4 inches minimum of aggregate base, level, and compact. as specified in Part 3.

5. Fill Slopes: Compact by rolling or using sheepsfoot roller.

6. Backfill Under Footings if required by geotechnical evaluation report.

7. Landscape Areas:

a. Compact fill to eighty-five (85) percent minimum relative compaction.

8. Other Backfills: Place other fills in 12 inch maximum uncompacted layers and compact to ninety-five (95) percent relative compaction.

9. Loose material from compacted subgrade surface shall be immediately removed before placing compacted fill or aggregate base course.

D. Fill to contours and elevations indicated using unfrozen materials.

E. Employ a placement method that does not disturb or damage other work.

F. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

G. Maintain optimum moisture content of fill materials to attain required compaction density.

H. Slope grade away from building minimum 2%, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 LIGHTWEIGHT (FLOWABLE) CONCRETE FILL

A. Install lightweight concrete fill according to manufacturer's written instructions.

B. Use batching, mixing, and placing equipment approved by the manufacturer.

C. Prevent segregation of material.

D. Tolerance: Finished surface within 2 inches of elevation indicated on drawings.

3.05 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated.

B. Over Subdrainage Piping at Foundation Perimeter and Under Slabs:
   1. Drainage fill and geotextile: Section 31 0519.
   2. Cover drainage fill with general fill.
   3. Fill up to subgrade elevation.
   4. Compact to 95 percent of maximum dry density.

3.06 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

B. Paving Areas:
   1. Survey and stake parking surfaces to show grading required by Contract Drawings.
   2. Subgrade (soil below aggregate base):
      a. Prepare natural soil subgrade or fill.
   3. Aggregate Base:
      a. Finish grade parking surface are to grades as required by Contract Drawings.
         1) 0.00 inches high and no more than 1/2 inch low.
      b. Measure using string line from curb to curb, gutter, flat drainage structure, or grade break.
      c. Finished aggregate base course shall be true to line and grade within plus or minus 1/4 inch in 10 feet.
      d. Maximum variation from required grades shall be 1/10 of one foot.

3.07 REPAIR / RESTORATION

A. Repair damage to other portions of the Work resulting from work of this Section at no additional cost to Owner. On new work, arrange for damage to be repaired by original installer.

3.08 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Field Tests and Inspections:
   1. Field tests and inspections and laboratory testing are provided by Owner's independent Testing Agency as specified in Section 01 4523.
      a. Quality Control is sole responsibility of Contractor:
         1) Owner's employment of an independent Testing Agency does no relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
            (a) Testing and inspections, if performed by Contractor, will be responsibility of Contractor to be performed by an independent entity.
   2. Fill/Engineered Fill:
      a. Testing Agency shall provide testing and inspection for fill.
      b. Number of tests may vary at discretion of Architect.
      c. Testing Agency is to provide one (1) moisture-maximum density relationship test for each type of fill material.
      d. Prior to placement of engineered fill, inspector shall determine that site has been prepared in accordance with geotechnical evaluation report.
      e. Footing sugrade: At footing subgrades, inspector is to verify that soils confor to geotechnical evaluation report.
      f. Testing Agency will test compaction of soils according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938 as applicable. Lift thicknesses shall comply with geotechnical evaluation report. Inspector shall determine that in-place dry density of

engineered fill material complies with geotechnical evaluation report. Tests will be performed at following locations and frequencies:

1) Paved Areas: At each compacted fill and backfill layer, at least one (1) test for every 10,000 sq. ft. or less of paved areas but in no case less than three (3) tests.
2) Building Slab Areas: At each compacted fill and backfill layer, at least one (1) test for every 2,500 sq. ft. or less of building slab area but in no case less than three (3) tests.
3) Foundation Wall/Continuous Footing Backfill: At each compacted backfill layer, at least one (1) test for each 40 linear feet or less of wall length, but no fewer than two (2) tests.
4) Trench Backfill: At each 12 inch compacted lift for each 100 linear feet or less of trench length but no fewer than two (2) tests.
5) Sidewalks, Curbs, Gutters, Exterior Pads: Minimum of one (1) test for each lift for each 40 linear feet or one (1) test for every 5,000 sq. ft. or less of pad area but no fewer than three (3) tests.

3. Aggregate Base:
   a. Interior slab-on-grade concrete areas:
      1) Testing Agency shall provide testing and inspection for interior aggregate base.
      2) Number of tests may vary at discretion of Architect.
      3) Testing Agency will test compaction of base in place according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
         (a) Building Slab Areas: One test for every 2,500 sq. ft. (232 sq. m) or less of building slab area but no fewer than three tests.
   b. Miscellaneous exterior concrete areas:
      1) Testing Agency shall provide testing and inspection for exterior aggregate base.
      2) Number of tests may vary at discretion of Architect.
      3) Testing Agency will test compaction of base in place according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
         (a) Sitework Areas: One test for every 10,000 sq. ft. (930 sq. m) or less of exterior pads area but no fewer than three tests.
   c. Paving area:
      1) Testing Agency shall provide testing and inspection for exterior aggregate base.
      2) Number of tests may vary at discretion of Architect.
      3) Testing Agency will test compaction of base in place according to ASTM D1556/D1556M, ASTM D2167, and ASTM D6938, as applicable. Tests will be performed at following frequency:
         (a) Sitework Areas: One test for every 10,000 sq. ft. (930 sq. m) or less of exterior pads area but no fewer than three tests.

C. Lightweight (Flowable) Concrete Fill:
   1. Sampling: During initial placement, take four 3 inch by 6 inch 3 inch by 6 inch test specimens per 303 cubic yards of material placed or for each four hours of placement work.
   2. Testing: Provide third-party testing of samples in accordance with ASTM C796/C796M except do not oven-dry load-test specimens.

3.09 PROTECTION

A. Interior Slab-On-Grade Concrete:
   1. Vapor Retarder:
      a. Do not allow water onto vapor retarder or aggregate base before placing concrete.
      b. Protect membrane from possible punctures caused by reinforcing bar supports before placing concrete.

3.10 CLEANING

A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 0113

ASPHALT PAVING SURFACE TREATMENT: Asphalt Based Penetrating Seal

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and apply asphalt based penetrating seal on existing asphalt paving as described in Contract Documents.

B. Related Requirements:
   1. Section 01 1200: 'Multiple Contract Summary' for multiple contracts.
   2. Section 01 4523: 'Testing and Inspecting Services' for testing and inspection, and testing laboratory services for materials, products, and construction methods.
   3. Section 32 0117.01: 'Asphalt Paving Crack Seal' for completion of crack repair.
   4. Section 32 0117.02: 'Asphalt Paving Crack Fill' for completion of crack repair.
   5. Section 32 0118: 'Asphalt Paving Repair – Full Depth Patch'.
   6. Section 32 1216: 'Asphalt Paving: Superpave Method'.
   7. Section 32 1216: 'Asphalt Paving: Marshall Method'.
   8. Section 32 1723: 'Pavement Markings'.

1.2 REFERENCES

A. Association Publications:
   1. Asphalt Institute:
      a. MS-4, '*The Asphalt Handbook'* (Seventh Edition).
      b. MS-16, '*Asphalt in Pavement Preservation and Maintenance'* (Fourth Edition).
   2. Asphalt Emulsion Manufacturers Association:
      a. MS-19, '*Basic Asphalt Emulsion Manual'* (Fourth Edition).

B. Definitions:
   1. Seal Coat: Thin surface treatment used to improve surface texture and protect asphalt surface. Main types of surface treatments are asphalt based emulsion seals, cape seals, chip seals, fog seals, micro surfacing, penetrating seals, refined coal tar emulsion seals, sand seals, sandwich seals and slurry seals.

C. Reference Standards:
   1. ASTM International:
      a. ASTM D4552/D4552M-10(2016), 'Standard Practice for Classifying Hot-Mix Recycling Agents'.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
   1. Participate in MANDATORY pre-installation conference as specified in Section 01 3100:
   2. Schedule asphalt based penetrating seal pre-installation conference to be held jointly with any other 'Asphalt Surface Treatment' sections involving asphalt maintenance:
   3. In addition to agenda items specified in Section 01 3100, review following:
      a. Review crack repair schedule and verify that other repairs will be completed before application of asphalt based penetrating seal.

b. Review asphalt based penetrating seal schedule.
c. Review asphalt based penetrating seal mix design.
d. Review asphalt based penetrating seal preparation requirements:
e. Review safety issues.

B. Scheduling:
1. Manufacturer Instructions:
a. Provide to Owner's Representative at least seven (7) days before asphalt based penetrating seal placement commences, approved Laboratory Report and Manufacturer's Certificate of compliance with these specifications covering specific materials to be used on this project.

1.4 SUBMITTALS

A. Action Submittals:
1. Provide Manufacturer's product literature.

B. Informational Submittals:
1. Design Submittals:
a. Asphalt Based Penetrating Seal:
1) Provide mix design for application rate of asphalt based penetrating seal.
2. Manufacturer Instructions:
a. Asphalt Based Penetrating Seal:
1) Provide Manufacturer's written substrate preparation and sealant application instructions.
3. Qualification Statement:
a. Installer / Supervisor:
1) Provide Qualification documentations if requested by Owner's Representative.

C. Closeout Submittals:
1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
a. Record Documentation:
1) Manufacturer's documentation:
a) Asphalt based penetrating seal product literature.
b) Design Data Submittal.

1.5 QUALITY ASSURANCE

A. Qualifications: Requirements of Section 01 4301 applies but not limited to following:
1. Installer:
a. Minimum five (5) years experience in asphalt surface treatment installations.
b. Minimum five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity in past three (3) years before bidding:
1) Project names and addresses.
2) Date of installations.
2. Supervisor:
a. Minimum of five (5) years satisfactorily completed projects of comparable quality, similar size, and complexity in past five (5) years as Supervisor of Applicators:
1) Project names and addresses.
2) Date of installation.
3) Name of Supervisor or Owner.
3. Upon request, submit documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage And Handling Requirements:

1. Asphalt Based Penetrating Seal:
    a. Following Manufacturer's recommendations.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
    1. Asphalt Based Penetrating Seal:
        a. Do not apply asphalt based penetrating seal when ambient temperatures will be less than 55 deg F (13 deg C) for twenty-four (24) hour period or surface temperature will be less than 60 deg F (16 deg C) for twenty-four (24) hour period.
        b. Do not apply asphalt based penetrating seal if subsequent temperatures for forty-eight (48) hours are anticipated to drop below 50 deg F (10 deg C).
        c. Do not apply asphalt based penetrating seal if it will be adversely affected by rain, or wet conditions or when surface contains standing water.

PART 2 - PRODUCTS

2.1 MATERIAL

A. Asphalt Based Penetrating Seal:
    1. Type One Acceptable Product and Manufacturers:
        a. APR-100 by Mariani Asphalt (An Associated Asphalt Company), Tampa, FL (813) 623-3941, www.associatedasphalt.com/companies/mariani-asphalt.
        b. GSB-78 Pavement Sealer and Rejuvenator by Asphalt Systems, Inc., Salt Lake City, UT (801) 972-6433 www.asphaltsystemsinc.com. (Use GSB-88 instead of GSB-78 on pavements less than two (2) years old).
        c. GSB-88 Pavement Sealer and Rejuvenator by Asphalt Systems, Inc., Salt Lake City, UT (801) 972-6433 www.asphaltsystemsinc.com.
        d. Quick-Dry Anti-Oxidene Penetrating Asphalt Coating (asphalt, air-blown (CAS# 64742-93-4),equal to /or not less than 50 to 65 percent by weight, white stoddard solvent (CAS# 8052-41-3) 35 to 50 percent by weight. No other unnecessary binders, fillers or additives) by Texas Refinery Corp., Fort Worth, TX (956) 492-6254 www.texasrefinery.com.
        e. Reclamite Preservative Seal by Tricor Refining LLC, Bakersfield, CA (661) 393-7110 www.reclamite.com.
        f. RS-90 Cutback Asphalt Seal Coating/Rejuvenator by Denver Industrial Sales & Service Company (DISSCO), Denver, CO (303) 935-2485 www.dissco.net.
        g. Equal as approved by Owner’s Representative before bidding. See Section 01 6200.
    2. Performance Requirement:
        a. Asphalt Based Penetrating Seal consisting of the following:
            1) Asphalt, CAS 8052-42-4 (or CAS 8052-41-3), 50 to 65 percent by weight and naphtha, CAS 8030-30-6, 35 to 50 percent by weight (or CAS 8008-20-9, 40 to 60 percent by weight) or white Stoddard solvent, CAS 64742-93-4, 35 to 50 percent by weight.
                a) No water is acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Evaluation And Assessment:
    1. Do not apply sealer on asphalt that has not aged for at least one (1) month minimum.
    2. Do not apply sealer over wet or damp pavement, or when precipitation is imminent.

3.2 PREPARATION

A. Owner Responsibilities:
   1. Remove Scout Trailer(s) if needed.

B. Surface Preparation:
   1. General:
      a. Do not allow irrigation watering for at least twenty-four (24) hours prior to application.
      b. Do not apply to new asphalt pavements (less than one (1) month) in that softening may occur.
      c. New asphalt and patched areas should be allowed to cure for at least thirty (30) days at 60 deg F (16 deg C) temperature prior to application to eliminate any concentration of oils on pavement surface. Longer cure times of up to sixty (60) days may be required. New asphalt must not exhibit ribboning, crawling nor show oil rings when clean water is poured onto surface.
         1) To determine if surface oils have dissipated, pour one (1) or two (2) gallons of clean water over pavement surface:
            a) If water sheets out, uniformly wetting surface and no oil rings appear, surface is ready to be sealed.
            b) If water balls up and/or shows signs of oil rings, additional curing time is required prior to sealing.
   2. Paint Stripes:
      a. During Evaluation and Assessment, verify if acrylic, thermoplastic or paint stripes must be removed in preparation for asphalt based penetrating seal application.
   3. Grease or Oil Patches:
      a. Remove grease or oil patches, and spillage of any material that has adhered to pavement. Do not place seal over unsound oil spots softened by fuel or oil.
      b. Clean oil spots and treat with oil spot primer.
      c. Seal areas damaged by oil or grease with an oil spot primer compatible with seal being used in accordance with Manufacturer's recommendations.
   4. Cleaning:
      a. Remove all debris, dirt, dust, leaves, loose material, moisture, mud spots, sand, silt spots, vegetation (including moss), water and other objectionable and foreign material from existing surface prior to placing seal. In areas where moss is prevalent, apply herbicide.
      b. Power brooms, power blowers, air compressors, vacuum sweepers, rotary brooms, water flushing equipment, and blowers, or by another approved method.
   5. Cracks:
      a. Repair cracks if required per Section 32 0117.01 ‘Asphalt Paving Crack Seal’ or Section 32 0117.02 ‘Asphalt Paving Crack Fill’ prior to placing asphalt based penetrating seal. Cracks that contain weed and other live vegetation matter must be treated with Pre-Emergent Herbicide prior to crack repair.

3.3 APPLICATION

A. Asphalt Based Penetrating Seal:
   1. Applied after Asphalt Paving is installed as specified in Section 1216: 'Asphalt Paving' as follows:
      a. Mandatory Asphalt Paving Surface Treatment (Asphalt Based Penetrating Seal) to be applied no sooner than thirty (30) days or no later than eighteen (18) months of placing Asphalt Paving to be included with this project.
   2. Surface preparation:
      a. Do not apply asphalt based penetrating sealer until completion of surface preparation items.
   3. Follow Manufacturer’s recommendations for application of sealer.
   4. Apply sealer without thinning from container using squeegee, brush, or sprayer at rate of 1-1/2 gallons (5.6 liters) per 100 square feet (9.3 square meters) minimum and 2 gallons (7.6 liters) per 100 square feet (9.3 square meters) maximum, depending on absorbency of pavement.

B. Paint Stripes:
   1. If paint stripes were removed in preparation for penetration seal, include following:

a. Apply paint stripes after asphalt based penetrating seal has been applied and cured.

3.4 CLEANING

A. General:
   1. Upon completion of asphalt based penetrating seal operations, clean up and remove debris.

3.5 PROTECTION

A. Do not allow traffic on paving until asphalt based penetrating seal is thoroughly cured:
   1. Warm weather condition is approximately twenty-four (24) hours.

B. Do not allow irrigation watering for at least twenty-four (24) hours after application.

END OF SECTION

SECTION 32 1216.04
ASPHALT PAVING - SUPERPAVE MIX

PART 1 GENERAL

1.01SUMMARY

A. Includes But Not Limited To:

1. Furnish and install asphalt paving in driveways and parking areas as described in Contract Documents including the following, but not limited to:

a. Asphalt Mix Design Criteria Summary:

1)	Asphalt Binder:	PG 58-28 (or Binder locally used by DOT)
2)	Nominal Maximum Size Aggregate (Nmas):	3/8 inch (9.5 mm)(3/4 inch for base with 1-1/2 inch top layer acceptable)
3)	Maximum Size Aggregate:	1/2 inch (1 inch for base with 1-1/2" top layer acceptable)
4)	Mix Designator (compaction effort); Ndesign:	50
5)	Antistrip Agent:	If required by supplier's mix design (use 1 percent or greater lime slurry when required.
6)	Asphalt Reinforcement Fibers:	Specified in Section 32 1217 as Alternate 'A' (not allowed in Welfare Services Projects)
		Allowed up to 25 percent. Asphalt binder shall be one grade softer when more than 15 percent RAP is used.
8)	ROSP:	Not allowed.
9)	Mineral Filler:	Not allowed.
10)	Warm Mix Additive:	If required by supplier's mix design.
11)	Recycle Agent:	If required by supplier's mix design.

b. Design Air Voids:
   1) Three and one-half percent (3.5 percent).

c. Tack coat: Application of asphaltic material to existing asphalt concrete or Portland concrete surfaces before asphalt concrete pavement.

d. Blotter materials and procedures for absorbing excess asphalt as required.

B. Related Requirements:

1. Section 31 2323: 'Fill and Aggregate Base' for compaction of aggregate base.
2. Section 31 2323: 'Fill and Aggregate Base' for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
3. Section 31 2323: 'Fill and Aggregate Base' for grading of subgrade below aggregate base and topsoil.
4. Section 31 2323: 'Fill and Aggregate Base' for compaction procedures and tolerances.
5. Section 32 0113.01: 'Asphalt Paving Surface Treatment: Penetrating Seal'.
6. Section 32 1717: 'Asphalt Reinforcement Fibers'.
7. Section 32 1723: 'Pavement Markings'.

1.02 PRICE AND PAYMENT PROCEDURES

A. Alternates:

1. Asphalt Reinforcement Fibers are bid as Alternate 'A' as specified in Price and Payment Procedures in Part 1 of Section 32 1216. Owner's Representative will review bid and decide if asphalt reinforcing fibers will be included in Project.

1.03 REFERENCES

A. Association Publications:
   1. Asphalt Institute, 2696 Research Park Dr., Lexington, KY www.asphaltinstitute.org:
      a. MS-2, 'Mix Design Methods' (7th Edition 2015).

B. Definitions:
   1. Aggregate: Hard inert mineral material, such as gravel, crushed rock, slag, or sand.
      a. Coarse Aggregate: Aggregate retained on or above No. 4 sieve.
      b. Coarse-Graded Aggregate: Aggregate having predominance of coarse sizes.
      c. Dense-Graded Aggregate: Aggregate that is graded from maximum size down through filler with object of obtaining an asphalt mix with controlled void content and high stability.
      d. Fine Aggregate: Aggregate passing No. 4 sieve.
      e. Fine-Graded Aggregate: Aggregate having predominance of fine sizes.
      f. Mineral Filler: Fine mineral product at least 70 percent of which passes a No. 200 sieve.
   2. Air Voids: Total volume of small air pockets between coated aggregate particles in asphalt cement concrete (ACC); expressed as percentage of bulk volume of compacted paving mixture.
   3. Anti-Stripping Agent: Chemicals added to bitumen to improve the adhesion of the bitumen to hydrophilic aggregates
   4. Asphalt Binder: Asphalt cement or modified asphalt cement that binds aggregate particles into dense mass.
      a. Asphalt Cement used in paving applications that has been classified according to the Standard Specification for Performance Graded Asphalt Binder, AASHTO Designation MP 320. It can be either unmodified or modified Asphalt Cement, as long as it complies with specifications.
   5. Asphalt-Aggregate Designator: Alpha-numeric code that indicates nominal maximum size of aggregate, and type and grade of asphalt in aggregate-asphalt mix.
      a. Example: "12.5 PG70-28" means aggregate asphalt mix shall be composed of aggregate gradation with 12.5 mm (1/2 inch) nominal maximum size and performance grade asphalt binder designed to perform between temperatures of 70 deg C and -28 deg C (158 deg F and -18.4 deg F).
   6. Equivalent Single Axle Load (ESAL): Effect on pavement performance of any combination of axle loads of varying magnitude equated to number of 18,000-lb. single-axle loads that are required to produce an equivalent effect.
   7. Maximum Size (Superpave): One sieve larger than the nominal maximum size.
   8. Ndesign (Superpave): Design number of gyrations used for design of Hot Mix Asphalt (HMA).
   9. Nominal Maximum Size: One sieve size larger than first sieve size retaining more than 10 percent of Sample. Nominal maximum size sieve will retain minimum of 0 and maximum of 10 percent of sample. Maximum size is one sieve size larger than nominal maximum size.
   10. Performance Graded Asphalt Binder (PGAB): Asphalt binder designed to produce HMA that meets certain performance standards. Designations for performance-graded asphalt binders are prefixed with PG. Each grade designation also includes two sets of numbers that denote temperature range. This is a range of climate temperatures to which road may be exposed and still be expected to give superior performance. PG numbers do not indicate viscosity as in conventional liquid asphalt designations.

11. Pre-emergent Herbicide: Chemical that is applied before weeds emerge. It acts by killing weed seedlings and /or establishing layer of chemical on or near soil surface that is toxic to germinating seeds and young seedlings.
12. Reclaimed Asphalt Pavement (RAP): Existing asphalt mixture that has been pulverized, usually by milling, and is used like aggregate in recycling of asphalt pavements.
13. Subgrade (definition varies depending upon stage of construction and context of work being performed):
    a. Prepared natural soils on which fill, aggregate base, or topsoil is placed.
    b. OR
    c. Prepared soils immediately beneath paving.
14. Tack Coat: Very light application of liquid asphalt, or asphalt emulsion diluted with water.

C. Reference Standards:
1. American Association of State and Highway Transportation Officials:
    a. AASHTO T 304-17: ‘Standard Method of Test for Uncompacted Void Content of Fine Aggregate’.
    b. AASHTO T 322-07(2016), ‘Standard Method of Test for Determining the Creep Compliance and Strength of Hot-Mix Asphalt (HMA) Using the Indirect Tensile Test Device.
2. ASTM International:
    a. ASTM C29/C29M-17a, ‘Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate'.
    b. ASTM C88-13, ‘Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate'.
    c. ASTM C117-17, ‘Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing'.
    d. ASTM C131/C131M-14, 'Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine’.
    e. ASTM C142/C142M-17, ‘Standard Test Method for Clay Lumps and Friable Particles in Aggregates'.
    f. ASTM D242/D242M-09(2014), ‘Standard Specification for Mineral Filler For Bituminous Paving Mixtures'.
    g. ASTM D977-17, 'Standard Specification for Emulsified Asphalt’.
    h. ASTM D979/D979M-15, 'Practice for Sampling Bituminous Paving Mixtures'.
    i. ASTM D2041/D2041M-11, 'Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures’.
    j. ASTM D2172/D2172M-17, ‘Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures’.
    k. ASTM D2256/ D2256M-10(2015), ‘Standard Test Method for Tensile Properties of Yarns by the Single-Strand Method’.
    l. ASTM D2397/D2397M-17, 'Standard Specification for Cationic-Emulsified Asphalt’.
    m. ASTM D2419-14, ‘Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate'.
    n. ASTM D2950/D2950M-17, ‘Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods'.
    o. ASTM D3203/D3203M-11, ‘Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures'.
    p. ASTM D3549/D3549M-17, ‘Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens’.
    q. ASTM D3665-12(2017), ‘Standard Practice for Random Sampling of Construction Materials’.
    r. ASTM D4318-17, ‘Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils'.
    s. ASTM D4552/D4552M-10(2016), ‘Standard Practice for Classifying Hot-Mix Recycling Agents'.

t. ASTM D4759-11(2018), ‘Standard Practice for Determining the Specification Conformance of Geosynthetics'.
u. ASTM D4791-10, ‘Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.
v. ASTM D5444-15, ‘Standard Method for Mechanical Size Analysis of Extracted Aggregate'.
w. ASTM D5821-13(2017), ‘Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate’.
x. ASTM D6307-16, ‘Standard Test Method for Asphalt Content of Hot-Mix Asphalt by Ignition Method'.
y. ASTM D6932/D6932M-08(2013), ‘Standard Guide for Materials and Construction of Open-Graded Friction Course Plant Mixtures’.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:
1. Participate in MANDATORY pre-installation conference as specified in Section 31 0500 ‘Common Earthwork Requirements’:
2. In addition to agenda items specified in Section 01 3100 ‘Project Management and Coordination’ and Section 31 0500 ‘Common Earthwork Requirements’, review following:
a. Review surveying and staking of parking areas and installation of sleeves.
b. Review proposed aggregate base schedule.
c. Review rough grading elevations before placing paving fill.
d. Review fine grading elevations of subgrade fine grading operations before placing aggregate base and paving.
e. Review proposed asphalt paving schedule.
f. Review asphalt paving mix design.
g. Review pre-emergent herbicide protection of adjoining property and planting area on site requirements, schedule and application requirements.
h. Review schedule of mandatory asphalt paving surface treatment to be applied after placement of asphalt paving.
i. Review schedule of paint stripes to be applied after asphalt paving surface treatment.
j. Review safety issues.
k. Review Section 01 4523 ‘Testing and Inspecting Services’ for administrative requirements and responsibilities and Field Quality Control tests and inspections required of this section.
1) Review requirements and frequency of testing and inspections.
2) Review Contractor Testing Agency Qualifications.

B. Notify Testing Agency and Architect twenty-four (24) hours minimum before placing asphalt paving.

1.05 SUBMITTALS

A. Action Submittals:
1. Product Data:
a. Pre-Emergent Herbicide:
1) Manufacturer's published product data on pre-emergent herbicide.

B. Informational Submittals:
1. Certificates:
a. Require mix plant to furnish delivery/load tickets for each batch of asphalt. Keep delivery tickets at job-site for use of Owner’s Representative. Tickets shall show following:
1) Name of mix plant.
2) Date
3) Name of contractor.
4) Name and location of Project.

5) Serial number of ticket.
6) Asphalt mix type.
7) Time loaded.
8) Identity of truck.

b. Installer to provide Manufacturer's Certificate of Compliance stating material authenticity and properties for review and acceptance by Architect before product use.

2. Design Data:
   a. Hot Mix Asphalt:
      1) Design Criteria:
         (a) Develop mix design according to current Asphalt Institute MS-2 'Asphalt Mix Design Methods' for Superpave Method.
         (b) Submittal format:
            (1) Design mix submittal shall follow format as indicated in current Asphalt Institute MS-2, 'Mix Design Methods.
      2) Mix design of asphalt paving must meet Design Criteria minimum requirements and show conformance to the following:
         (a) Location and name of hot mix asphalt concrete production facility.
         (b) Date of mix design. If older than two (2) years, recertify mix design.
         (c) Asphalt mix type.
         (d) Mix design method used.
         (e) Mix density.
         (f) Design air voids (three and one half (3.5) percent.
         (g) Asphalt content in percent.
         (h) Performance grade of asphalt binder.
         (i) Nominal maximum size of aggregate.
         (j) Maximum size of aggregate.
         (k) Aggregate source and gradation.
         (l) Mix properties and design parameters.
         (m) Temperature of mix at plant and in the field for optimum field compaction.
         (n) Amount of recycled asphalt pavement (RAP).
         (o) Mineral fillers, antistrip, and recycle agent percentages.
         (p) Identify if warm mix technologies will be used and how much warm mix additive will be used.
      3) Within thirty (30) days prior to asphalt construction, submit actual design mix to Architect, Civil Engineering Consultant of Record and Independent Testing Laboratory for review and approval.
3. Test And Evaluation Reports:
   a. Hot Mix Asphalt:
   b. Contractor's Testing Agency copies of Field Test results to show compliance with all contract requirements and quality control for quality of asphalt mixture and asphalt installation.
   c. Owner's Testing Agency copies of Field Tests and Inspections used to validate or determine discrepancies with testing by Contractor.
4. Manufacturer Instructions:
   a. Pre-Emergent Herbicide:
      1) Application instructions for pre-emergent herbicide.
   b. Qualification Statement:
      1) Installer:
         (a) Provide Qualification documentation if requested by Owner's Representative.

C. Closeout Submittals:

1. Include following in Operations And Maintenance Manual specified in Section 01 7800 'Closeout Submittals':
    a. Record Documentation:
        1) Manufacturer's documentation:
            (a) Pre-emergent herbicide documentation.
            (b) Asphalt paving design.
            (c) Test reports.
            (d) Certificates from mix plant of delivery/load tickets.
            (e) Manufacturer's Certificate of Compliance.
        2) Testing and Inspection Reports:
            (a) Testing Agency Testing and Inspecting Reports of asphalt paving.

1.06 QUALITY ASSURANCE

A. Qualifications. Requirements of Section 01 4301 'Quality Assurance - Qualifications' applies but not limited to following:
    1. Asphalt Paving:
        a. Foreman of asphalt paving crew has completed at least three (3) projects of similar size and nature.
        b. Upon request, submit documentation.
    2. Pre-emergent herbicide:
        a. Applicator:
            1) Pre-emergent herbicide shall be applied by applicator certified by State in which Project is located as an applicator of agricultural chemicals.

B. Testing and Inspection:
    1. Owner is responsible for Quality Assurance. Quality assurance performed by Owner will be used to validate Quality Control performed by Contractor.
    2. Owner will provide Testing and Inspection for asphalt paving:
        a. Owner will employ testing agencies to perform testing and inspection for asphalt paving as specified in Field Quality Control in Part 3 of this specification.
            1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform the Work in strict accordance with requirements of Contract Documents and perform contractor testing and inspection.
            2) See Section 01 1200: 'Multiple Contract Summary'.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Acceptance Requirements:
    1. Asphalt Material:
        a. Each shipment must:
            1) Be uniform in appearance and consistency.
            2) Show no foaming when heated to specified loading temperature.
        b. Do not supply shipments contaminated with other asphalt types or grades than those specified:
            1) Do not use petroleum distillate as a release agent.
    2. Pre-emergent herbicide:
        a. Materials shall be delivered in original, unopened packages with labels intact.

B. Storage And Handling Requirements:
    1. Pre-emergent herbicide:
        a. Do not freeze. Store in at temperatures above 41 deg F .
        b. Follow Manufacturer's storage and handling requirements.

1.08 FIELD CONDITIONS

A. Ambient Conditions:
    1. Pre-emergent herbicide:

a. Follow printed Manufacturers instruction for environmental hazards:
b. Follow printed Manufacturers instruction ambient conditions for application of product.

2. Tack Coat:
   a. Apply only when air and roadbed temperatures in shade are greater than 40 deg F . Temperature restrictions may be waived only upon written authorization from Architect or Civil Engineer.
   b. Do not apply to wet surfaces.
   c. Do not apply when weather conditions prevent tack coat from adhering properly.
3. Asphalt paving:
   a. Do not perform work during following conditions:
      1) Ambient temperature is below 45 deg F or will fall below 45 deg F during placement.
      2) Temperature of aggregate base below 50 deg F.
      3) Cold Weather Asphalt Paving Plan: If asphalt pavement is placed outside of these temperature limits or those identified in MINIMUM Temperature Degrees, a plan is required which includes:
         (a) Haul times.
         (b) Placement details.
         (c) Compaction aids used in production.
         (d) Owner does not assume responsibility for asphalt when placed outside temperature limits.
      4) Presence of free surface water or weather is unsuitable.
      5) Wind or ground cools mix material before compaction.

PART 2 PRODUCTS

2.01 DESIGN CRITERIA

A. General:
   1. Follow current Asphalt Institute MS-2 ‘Asphalt Mix Design Methods’ for Superpave Method.

B. Asphalt Mix:
   1. Asphalt Binder:
      a. Performance Graded Asphalt Binder:
         1) Use performance graded asphalt binder identified under Asphalt Mix Design Criteria.
   2. Aggregates:
      a. Use clean, hard, durable, angular, sound, consisting of crushed stone, crushed gravel, slag, sand, or combination.
      b. Use nominal maximum size aggregate and maximum size aggregate per Asphalt Mix Design Criteria. Aggregate gradation to meet Table 1 - MASTER GRADING BANDS requirements:

Table 1 - MASTER GRADING BANDS

Sieve (mm)		Nominal Maximum Aggregate Size	
		12.5 mm	9.5 mm
Control Sieves	19	100	-
	12.5	100	100
	9.5	< 90	90 – 100
	4.75	--	< 90
	2.36	28 – 58	32 – 60
	0.075	2 – 10	2 – 10
Restricted	2.36	39.1	47.2

Zone	1.18	25.6 – 31.6	31.6 – 37.6
	0.6	19.1 – 23.1	23.5 – 27.5
	0.3	15.5	18.7

NOTES:
1. It is assumed fine and coarse aggregate have same bulk specific gravity.
2. Gradation is expressed in percent passing by weight, ASTM C136. Percentage of fines passing 0.075 mm control sieve determined by washing, ASTM C117.

c. Provide aggregate material properties to meet Table 2 – AGGREGATE PHYSICAL PROPERTIES requirements:

Table 2 –AGGREGATE PHYSICAL PROPERTIES

Property		ASTM	ESAL	Min	Max
Coarse Aggregate (does not pass No. 4 sieve)					
Angularity (fractured faces), percent		D5821	less than 0.3	55	--
			0.3 to 3.0	75	--
			greater than 3.0	85/80	--
Wear (hardness or toughness), percent		C131/C131M	less than 0.3	--	40
			0.3 to 3.0	--	35
			greater than 3.0	--	35
Flats or elongates (3:1 length to width), percent, maximum		D4791	--	--	20
Fine Aggregate (passing No. 4 sieve)					
Angularity (uncompacted void content), percent (AASHTO T304)		--	less than 0.3	--	--
			0.3 to 3.0	40	--
			greater than 3.0	45	--
Sand equivalent, percent		D2419	less than 0.3	40	--
			0.3 to 3.0	40	--
			greater than 3.0	45	--
Friable particles, percent		C142	--	--	2
Plastic limit, maximum	Liquid limit	D4318	--	--	25
	Plastic limit	D4318	--	--	6

Notes:
1. ESAL in millions.
2. Angularity by weight retained above 9 mm sieve, with at least one fractured face. 85/80 denotes 85 percent coarse aggregate has one fractured face and 80 percent has two or more fractured faces.
3. Wear of aggregate retained above 2.36 mm sieve unless specific aggregates have higher values are known to be satisfactory.
4. Flats or elongates retained above 4.75 mm sieve.
5. Friable particles passing No. 4.75 mm sieve.
6. Plasticity, passing No. 4.75 sieve. Aggregate is no-plastic even when filler material is added to aggregate.

Blended Physical Properties				
Dry-rodded unit weight, lb/ft3, minimum	C29/C29M	-	75	--
Weight loss (soundness), percent,	C88		--	16

maximum				
Clay content or cleanliness (sand equivalent), percent	D2419	less than 0.3	45	--
		more than 0.3	60	--
Notes: 1. Weight loss using sodium sulfate. 2. Sand equivalent value is after going through dryer or before drum mixer. The sand equivalent requirement is waived for RAP aggregate but applies to remainder of aggregate blend. 3. Friable particles of clay lumps, shale, wood, mica, and coal passing 4.75 sieve.				

3. Admixture:
   a. Antistrip: Heat stable, cement slurry, lime slurry, dry lime, or liquid antistrip:
      1) Add if mix is moisture sensitive as determined by 'Moisture Susceptibility' paragraph below.
   b. Mineral Filler: Comply with requirements of ASTM D242/D242M.
   c. Recycle Agent: Comply with requirements of ASTM D4552/D4552M.

2.02 MATERIAL

A. Aggregate Base: Conform to applicable requirements as specified in Section 31 2323: 'Fill and Aggregate Base'.

B. Asphalt Paving Surface Treatment:
   1. Include mandatory Asphalt Paving Surface Treatment to be applied no sooner than thirty (30) days or no later than eighteen (18) months of placing Asphalt Paving to be included with this project:
      a. Asphalt Based Penetrating Seal as specified in Section 32 0113.01 'Asphalt Paving Surface Treatment: Asphalt Based Penetrating Seal'.

C. Pre-Emergent Herbicide:
   1. Design Criteria:
      a. Selective type pre-emergence control chemical containing twenty-five (25 percent) Prometon minimum for control of annual grasses and broadleaf weeds.
      b. Non-oil based sterilant.
      c. Labeled for under-pavement use.
   2. Type Two Acceptable Products:
      a. Pramitol 25E Herbicide by WinField United, St Paul MN www.winfieldunited.com.
         1) Apply at a rate of 10 gal per 1 acre) conforming to application rates indicated on product label.
      b. Equal as approved by Architect before installation. See Section 01 6200.

D. Reclaimed Asphalt Pavement (RAP). Aggregate: Restrictions include:
   1. Allowed up to 25 percent. Asphalt binder shall be one grade softer when more than 15 percent RAP is used.

E. Tack Coat:
   1. Emulsified asphalt meeting requirements of ASTM D977, Grade SS-1H, CQS-1H, or ASTM D2397/D2397M, Grade CSS-1H.

PART 3 EXECUTION

3.01 INSTALLERS

A. Approved Applicators. See Section 01 4301 'Quality Assurance - Qualifications':

3.02 PREPARATION

A. General:
   1. Aggregate base and paving must be placed before any moisture or seasonal changes occur to subgrade that would cause compaction tests previously performed to be erroneous. Re-compact and retest subgrade soils that have been left exposed to weather.

B. Protection Of In-Place Conditions:
   1. Pre-emergent herbicide:
      a. Take necessary precautions to protect adjoining property and areas designated for planting on building site.
      b. Do not contaminate any body of water by direct application, cleaning of equipment or disposal of wastes.
   2. Asphalt Paving:
      a. Protect all structures, including curb, gutter, sidewalks, guard rails and guide posts.
      b. Protect neighborhood, storm drains and down-stream fish habitat.

C. Surface Preparation:
   1. Survey and stake parking surfaces to show grading required by Contract Documents.
   2. Subgrade (soil below aggregate base):
      a. Prepare natural, or fill, soil subgrade as specified in Section 31 2323 - Fill and Aggregate Base.
   3. Aggregate base:
      a. Finish grade parking surface area to grades required by Contract Documents.
      b. Compact aggregate base as specified in Section 31 2323 'Fill and Aggregate Base'.
      c. Tolerances:
         1) Elevation of aggregate base shall be as specified in Section 31 2323 - Fill and Aggregate Base.
   4. Tack coat:
      a. Clean surface of all materials such as mud, dirt, leaves, etc. that prevent tack from bonding to existing surfaces.
         1) If flushed, allow surface to dry.
   5. Asphalt paving:
      a. Area shall be clean and tack coat applied before placing of asphalt paving.
         1) Remove all moisture, dirt, sand, leaves, and other objectionable material from prepared surface before placing asphalt.
         2) Locate, reference, and protect all utility covers, monuments, curb, and gutter and other components affected by asphalt paving operations.
         3) Allow sufficient cure time for tack coat before placing asphalt.

3.03 APPLICATION

A. Interface With Other Work:
   1. Section 31 2323: 'Fill and Aggregate Base' for compaction of aggregate base.
   2. Section 31 2323: 'Fill and Aggregate Base' for rough grading and preparation of natural soil subgrades below fill and aggregate base materials.
   3. Section 31 2323: 'Fill and Aggregate Base' for grading of subgrade below aggregate base and topsoil.
   4. Section 31 2323: 'Fill and Aggregate Base' for compaction procedures and tolerances.

B. Pre-Emergent Herbicide:
   1. Asphalt paving areas:
      a. Follow Manufacturer's printed application requirements:
      b. Apply to prepared subgrade dispersed in liquid. Concentrate shall be such that Manufacturer's full recommended amount of chemical will be applied to every 1000 sq ft and liquid will penetrate minimum of 2 inches.
      c. Application shall be no more than one (1) day before installation of aggregate base.

C. Tack Coat:
   1. General:
      a. Tack coat vertical surfaces or existing asphalt cement concrete or portland cement concrete that will be in contact with asphalt paving.
      b. Use tack coat diluted to a 2:1 (concentrate water) ratio.
      c. Use pressure distributor to apply in uniform, continuous spread.

d. Cover all tacked surface areas with surfacing materials same day of application.

2. Application rate. Typically, as follows:
   a. Emulsions, 0.08 to 0.15 gallons per sq yd of diluted material:
      1) Apply sufficient to achieve ninety-five (95) percent or better coverage of existing surfaces.
      2) Above application rates may vary according to field conditions. Obtain approval from Civil Engineer for quantities, rate of application, temperatures, and areas to be treated before any application.

D. Asphalt Paving:
1. General:
   a. Paving adjacent to cast-in-place concrete site elements shall be between 1/4 inch higher than concrete.
   b. Surface texture of hand worked areas shall match texture of machine-laid areas.
   c. Surface shall be uniform with no 'birdbaths'. Leave finished surfaces clean and smooth. Variations from specified grades shall not exceed 1/2 inch .
   d. Cross Slope: 1/4 inch in 10 feet perpendicular to centerline except at cross section grade breaks.
   e. Grade: 1/8 inch in 10 feet parallel to centerline.
   f. Do not place on frozen aggregate base or during adverse climatic conditions such as precipitation or when roadway surface is icy or wet.
   g. Uniformly mix materials so aggregate is thoroughly coated with asphalt.
   h. Place at temperatures established by the mix design with self-propelled laydown machine.
   i. Use Table 3 – MINIMUM TEMPERATURE, DEGREES as guide:

Table 3 – MINIMUM TEMPERATURE, DEGREES

Ambient Air Temperature Deg F.	Compacted Paving Mat Thickness					
	3/4" (19 mm)	1" (25 mm)	1 1/2" (38 mm)	2" (50 mm)	3" (75 mm)	4" + (100 mm)
45 – 50	---	---	---	---	280	265
50 – 59	---	---	---	280	270	255
60 – 69	---	---	285	275	265	250
70 – 79	285	285	280	270	265	250
80 - 89	280	275	270	265	260	250
90+	275	270	265	260	250	250

   j. Longitudinal bituminous joints shall be vertical and properly tack coated if cold. Transverse joints shall always be tack coated.
2. Compaction:
   a. Compact asphalt paving to ninety-four (94) percent plus or minus two (2) percent of theoretical maximum specific gravity, ASTM D2041/D2041M (Rice Method - maximum theoretical density).
   b. Roll with powered equipment capable of obtaining specified density while providing required smoothness.
   c. Begin breakdown rolling immediately after asphalt is placed when asphalt temperature is at maximum.
   d. Complete handwork compaction concurrently with breakdown rolling.
   e. Execute compaction so visibility of joints is minimized:
   f. Complete finish rolling to improve asphalt surface as soon as possible after intermediate rolling and while asphalt paving is still warm.
   g. Do not use vibration for finish rolling.
3. Lift Thickness:
   a. Preferred Method:

1) For pavements 3-1/2 inch or thinner apply asphalt paving in single lift.
2) For pavements greater than 3-1/2 inch, use alternate method below.

b. Alternate Method:
1) Asphalt paving may be applied in two (2) lifts, first 2 inches thick minimum and second 1 1/2 inches thick minimum following temperature recommendations of following paragraph.
2) Surface of first lift shall be clean and provide tack coat between first and second lifts.
3) Provide not less than two (2) times maximum aggregate size in compacted asphalt concrete mixes.

E. Asphalt Paving Surface Treatments:
1. Apply mandatory Asphalt Paving Surface Treatment no sooner than thirty (30) days or no later than eighteen (18) months of placing Asphalt Paving to be included with this project. Do not apply prior to asphalt curing (refer to 'Asphalt, Concrete and Pervious Concrete Maintenance Guidelines'):
a. Asphalt Based Penetrating Seal as specified in Section 32 0113.01 'Asphalt Paving Surface Treatment: Asphalt Based Penetrating Seal'.

F. Paint Stripes:
1. Apply paint stripes after asphalt paving surface treatment has been applied to asphalt paving.

3.04 FIELD QUALITY CONTROL

A. Field Tests And Inspections:
1. Civil and structural field tests, laboratory testing, and inspections are provided by Owner's independent Testing Agency as specified in Section 01 4523 'Testing And Inspection Services':
a. Quality Control is sole responsibility of Contractor:
1) Owner's employment of an independent Testing Agency does not relieve Contractor of Contractor's obligation to perform testing and inspection as part of his Quality Control:
(a) Testing and inspections will be responsibility of Contractor to be performed by an independent entity.
2) Contractor bears full responsible for compliance with all contract requirements and quality control on project and will be responsible for quality of asphalt mixture and asphalt installation.

B. Field Tests (Provided by Contractor):
1. General:
a. Contractor bears full responsibility for compliance with all contract requirements and quality control on project and will be responsible for quality of asphalt mixture and asphalt installation.
b. Testing and Inspection Reports to be distributed as specified in Section 01 4523 'Testing And Inspection Services'.
2. Compaction Tests:
a. Contractor to provide compaction tests of asphalt being placed to establish rolling patterns and installation procedures.
b. Compaction tests by Contractor are independent of compaction tests being provided by Owner. See Section 01 4523 'Testing And Inspection Services'.
c. Asphalt paving shall be compacted to ninety-four (94) percent of Theoretical Maximum Specific Gravity (Rice) plus three (3) percent or minus two (2) percent. Determine percent compaction by ASTM D2041/D2041M.
3. Thickness Tests:
a. Determine thickness of paving being placed, no less than one (1) test per 10,000 sq. ft. of paving or portion thereof, three (3) tests minimum.

C. Field Tests And Inspections (Provided by Owner):
1. General:
a. Compaction tests provided by Owner will be used to validate or determine discrepancies with testing by Contractor.
b. Civil engineer applies pay factor for Gradation/Asphalt Content, In-Place Density. Civil engineer computes pay factor for each lot.
c. Opening paved surface to traffic does not constitute acceptance.
d. Unless required by the Owner's Representative, Testing Agency is to base compaction testing on Contractor's submitted mix design for theoretical maximum specific gravity (Rice) or Marshall specific gravity (Bulk) values.
e. Asphalt-aggregate mix sampling as per ASTM D979/D979M.
1) Test for:
(a) Air voids as per ASTM D3203/D3203M.
(b) Asphalt binder content as per ASTM D6307.
(c) Aggregate gradation as per ASTM D5444.
f. Lot size: 10,000 sq. ft. or part thereof.
g. Sub lot size: 5,000 sq. ft. or part thereof.
2. At Site Testing and Inspection:
a. Asphalt Paving:
1) Testing Agency shall provide full time nuclear density testing and inspection for asphalt paving during asphalt paving operations (nuclear density testing is informational testing only and does not constitute acceptance by Owner).
2) Inspection to include:
(a) Aggregate coating.
(b) Compaction control and effort required.
(c) Suitability of spreading and asphalt paving equipment.
(d) Temperature of mix as delivered and placed.
(1) Reject mixes exceeding 325 deg F in transport vehicle as required in Non-Conforming Work below.
(2) Dispose of cold mix in paver hopper as thin spread underlay.
3) Field Tests:
(a) When tested with 10 foot straight edge, surface of completed work shall not contain irregularities in excess of 1/4 inch.
(b) Determine percent compaction per ASTM D2950/D2950M unless other nondestructive nonnuclear methods such as sonar are used.
(c) Provide written nuclear density testing, or other nondestructive nonnuclear methods such as sonar, of asphalt paving at minimum rate of one (1) per 2,500 sq. ft. (232 sq. m). Select test locations by ASTM D3665 and sample per ASTM D979/D979M before compaction. Minimum of three (3) tests required.
(d) Compact asphalt paving to ninety-four (94) percent of Theoretical Maximum Specific Gravity (Rice) plus three (3) percent or minus two (2) percent.
(e) Maximum average total air voids in completed hot mix asphalt shall be eight (8) percent but more than three (3) percent as determined by ASTM D2041/D2041M.
(f) Determine thickness of paving being placed, no less than one (1) test per 10,000 sq. ft. of paving or portion thereof, three (3) tests minimum.
3. At Laboratory Testing:
a. General:
1) Provide at least one (1) laboratory test series for every 10,000 sq. ft. (930 sq. m) or part thereof (minimum of one (1) test):
(a) Test reports will show compliance with Contract Documents regarding type and depth of aggregate base, depth and density of asphalt paving, asphalt

content, aggregate gradation, flow and stability, bulk specific gravity and maximum specific gravity.

(b) Reports will also give test procedures used by testing laboratory.

b. Compaction and Final Density:

1) Pavement thickness and final density to be determined by results of coring. Provide one (1) core per 10,000 sq. ft. or part thereof. Minimum of three (3) tests required if under 30,000 sq. ft. .

(a) Based upon core samples, compaction is acceptable if test deviations are within pay factor 1.00 limits.

(b) At Project Manager's discretion, after consulting with Design Team, a Lot with a sub-lot test deviation greater than Reject may stay in place at fifty (50) percent cost.

(c) Select test locations by ASTM D3665 and sample per ASTM D979/D979M after compaction.

c. Compaction Pay Factor:

1) Based upon core samples, compaction is acceptable if test deviations are within pay factor 1.00 limits.

2) At Project Manager's discretion, after consulting with design team, a Lot with a sub-lot test deviation greater than Reject may stay in place at fifty (50) percent cost.

3) Average Density, in percent as shown in Table 4 – COMPACTION PAY FACTORS:

Table 4 – COMPACTION PAY FACTORS
(94 percent of theoretical maximum specific gravity – Superpave (Rice)
(ASTM D2041/D2041M plus three (3) or minus two (2) percent)

Pay Factor	Density, in Percent	
	Average	Lowest Test
0.70	More than 96	---
1.00	92 to 96	89 or Greater
0.90	92 to 96	Less than 89
Reject	Less than 92	---

Notes:
1. At Contractor's discretion and expense, do Hamburg wheel track test (AASHTO T 304) on 3 additional random core samples from non-complying sub-lot of 5,000 sq. ft. Sub-lot will be accepted if average rut depth is less than 10 mm at 20,000 passes.

d. Pavement Thickness:

1) Pavement thickness and final density to be determined by results of coring. Provide one (1) core per 10,000 sq. ft. or part thereof. Minimum of three (3) tests required if under 30,000 sq. ft.

(a) Acceptance will be based on the average of all thickness tests.

(b) At Project Manager's discretion, after consulting with design team, payment may be made for areas deficient in thickness by more than 0.75 inches at fifty (50) percent. If not, remove and replace at no additional cost to the Owner as shown in Table 5 – THICKNESS PAY FACTORS:

Table 5 – THICKNESS PAY FACTORS

Pay Factors	Thickness Deficiency, in Inches (ASTM D3549/D3549M)
1.00	0.00 to 0.25
0.90	0.26 to 0.50
0.70	0.51 to 0.75

Reject	0.76 to 1.00

e. Air Voids:
   1) Basis of evaluation is laboratory compacted samples (not field compacted samples).
   2) Air voids will be mix design target plus or minus one (1) percent.
   3) If test results are not within this Section's limits, options include correction of production procedures or alternate mix design acceptable to Civil Engineer.

D. Non-Conforming Work: Non-conforming work as covered in the General Conditions applies, but is not limited to the following:
   1. Asphalt Paving:
      a. Deficient asphalt paving thickness:
         1) Place additional material over deficient areas. Do not skin patch. Mill for inlay if necessary. Correct deficient asphalt paving thickness at no additional cost to the Owner.
      b. Rejection and Removal of Asphalt Paving:
         1) Remove asphalt paving found defective after installation and install acceptable product at no additional cost to the Owner.
      c. Removal of Asphalt Paving:
         1) Remove spatter, over-coat, or mar at no additional cost to the Owner.
         2) Remove asphalt from borrow pits or gutters at no additional cost to the Owner.
      d. Repair of Asphalt Paving:
         1) Repair or replace defective joints, seams, edges at no additional cost to the Owner.

3.05 PROTECTION

A. Tack Coat:
   1. Protect all surfaces exposed to public view from being spattered or marred. Remove any spattering, over-coating, or marring at no additional cost to Owner.
   2. Traffic:
      a. Do not permit traffic to travel over tacked surface until tack coat has cured and dried.

B. Asphalt Paving:
   1. Protect hot mixed asphalt (HMA) pavement from traffic until mixture has cooled enough not to become marked.

3.06 CLEANING

A. Waste Management:
   1. Pre-emergent herbicide:
      a. Follow Manufacturer's recommendations for disposal of product at approved waste disposal facility.
         1) Do not reuse empty containers.

END OF SECTION

BLANK PAGE

SECTION 32 1713

PARKING BUMPERS

PART 1 - GENERAL

1.1 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install parking bumpers as described in Contract Documents.

1.2 REFERENCES

A. Reference Standards:
   1. ASTM International:
      a. ASTM A615/A615M-18, ‘Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement'.
      b. ASTM A1064/A1064M-18a, 'Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete'.
      c. ASTM C33/C33M-18, ‘Standard Specification for Concrete Aggregates'.
      d. ASTM C150/C150M-18, ‘Standard Specification for Portland Cement'.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Precast Concrete:
   1. Cement: ASTM C150/C150M, Type II.
   2. Aggregates: ASTM C33/C33M.

B. Reinforcing:
   1. Bars: ASTM A615/A615M, Grade 60.
   2. Reinforcing Mesh: ASTM A1064/A1064M.

C. Sealants:
   1. Category Four Approved Products. See Section 01 6200 for definitions of Categories:
      a. Dow Corning Corp, Midland, MI www.dowcorning.com:
         1) Primer: 1200 Prime Coat.
         2) Sealant: 790 Silicone Building Sealant.
      b. Momentive Performance Materials Inc. (formally GE Sealants & Adhesives), Huntersville, NC www.ge.com/siliconesPrimer: SS4044 Primer.
         1) Primer: SS4044 Primer.
         2) Sealant: GE SCS2000 SilPruf Silicone Sealant & Adhesive.

D. Pins: Epoxy coated No. 4 bar, 24 inches (610 mm) long.

2.2 FABRICATION

A. Precast Concrete Parking Bumpers:
   1. 3000 psi (20.68 MPa) concrete minimum.
   2. Chamfered edges.
   3. Smooth finish free from pits and rock pockets.

4. Cast openings for pins.
5. Cast in two (2) bars, No. 3 minimum, full length of bumper less coverage requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install level with paving and aligned with sidewalks.

B. Recess anchoring pins 1/2 inch (12.7 mm) below top of bumper. Install sealant in hole to top of bumper.

END OF SECTION

SECTION 32 1723.01
PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SUMMARY

A. Includes But Not Limited To:
   1. Furnish acrylic paint and apply pavement and curb markings as described in Contract Documents including:

1.02 REFERENCES

A. Reference Standards:
   1. Federal Specifications and Standards:
      a. FED-STD-595C, 'Federal Standard: Colors Used in Government Procurement' (16 Jan 2008).
      b. FED TT-P-1952F, 'Paint, Traffic and Airfield Marking, Waterborne' (17 Feb 2015).
   2. Master Painters Institute:
      a. MPI (APL) - Master Painters Institute Approved Projects List; Master Painters and Decorators Association; Current Edition.
   3. Department of Transportation Federal Highway Administration:
      a. FHWA MUTCD-10, 'Manual on Uniform Traffic Control Devices'.

1.03 SUBMITTALS

A. Action Submittal:
   1. Product Data:
      a. Manufacturer's published product data and certification that product supplied meets requirements of this specification.

B. Informational Submittal:
   1. Test And Evaluation Reports:
      a. Acrylic Paint:
         1) Provide reports showing compliance to FED TT-P-1952F.

C. Closeout Submittals:
   1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
      a. Record Documentation:
         1) Manufacturer's Documentation:
            (a) Product data.
            (b) Specification compliance documentation.
         2) Testing and Inspection Reports:
            (a) Reports showing compliance.

1.04 QUALITY ASSURANCE

A. Regulatory Agency Sustainability Approvals:
   1. Paint must meet requirements of FED TT-P-1952-F and local regulations for VOC.
   2. Paint handicap spaces to conform to ADA Standards and local code requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Materials shall be delivered in original, unopened containers with labels intact.
      a. Labels to include:
         1) Manufacturer's name and address.
         2) TT-P-1952F reference.
         3) Classification Type.
         4) Color.

B. Storage And Handling Requirements:

1. Follow Manufacturer's storage and handling requirements.
2. Protect stored material from freezing at temperatures above 35 deg F or above 115 deg F.
3. Do not invert or roll containers.

1.06 FIELD CONDITIONS

A. Ambient Conditions:
   1. Acrylic Paint:
      a. Apply only on dry clean surfaces, during favorable weather (not excessively windy, dusty, or foggy), and when damage by rain, fog, or condensation not anticipated.
      b. Paving surface and Ambient temperature shall be minimum 50 deg F and rising.
      c. Temperature shall not drop below 50 deg F within twenty-four (24) hour period following application.
      d. Acetone based paints that are one hundred (100) percent acrylic shall not drop below 32 deg F within twenty-four (24) hour period following application.

PART 2 PRODUCTS

2.01 MATERIAL

A. Acrylic Paint:
   1. Description:
      a. Low VOC, ready-mixed, one- component, acrylic waterborne traffic marking paint suitable for application on concrete, asphalt, sealers, and previously painted areas of these surfaces.
   2. Design Criteria:
      a. General:
         1) Traffic Paint.
         2) Non-volatile portion of vehicle for all classification types shall be composed of one hundred (100) percent acrylic.
         3) Meet FED TT-P-1952F specification requirements.
         4) Fast drying when applied at ambient conditions requirement.
         5) Low VOC.
         6) Non-Reflectorized.
         7) Traffic paints not intended for use as floor paints. Do not use on pedestrian walkways or large surfaces such as ramps, floors and stairs which may become slippery when wet.
      b. Classification:
         1) Type I for use under normal conditions.
         2) Type II for use under adverse conditions.
         3) Type III for increased durability.
      c. Composition:
         1) Non-volatile portion for all types shall be composed of one hundred (100) percent acrylic polymer as determined by infrared spectral analysis.
         2) Prohibited material:
            (a) Product does not contain mercury, lead, hexavalent chromium, toluene, chlorinated solvents, hydrolysable chlorine derivatives, ethylene-based glycol ethers and their acetates, nor any carcinogen.
      d. Qualitative Requirements:
         1) Meet FED TT-P-1952F requirements for:
            (a) Abrasion resistance.
            (b) Accelerated package stability.
            (c) Accelerated weathering.
            (d) Appearance.
            (e) Color requirements:
            (f) Color Match (all colors except white and yellow).
            (g) Daylight directional reflectance.

(h) Yellow color match.
(i) Condition in container.
(j) Dry-through (early washout) for Type II only.
(k) Flexibility.
(l) Freeze/thaw stability.
(m) Heat-shear stability.
(n) Scrub resistance.
(o) Skinning.
(p) Titanium dioxide content.
(q) Water resistance.

e. Quantitative requirements:
1) Meet FED TT-P-1952F requirements (Table 1).
2) Acetone based paints that are one hundred (100) percent acrylic and have exempt status under Federal law are exempt from meeting FED TT-P-1925F requirements.

3. Colors:
a. General:
1) Traffic Paint will be furnished in white and any Federal Standard 595 color in accordance to FED-STD-595C:
(a) Yellow: 33538.
(b) Blue: 35180.
(c) Red: 31136.

b. White (Yellow may be used at Owner Representative's discretion):
1) Lane lines, edge lines, transverse lines, arrows, words, symbol markings, speed bump markings, parking space markings.

c. Yellow:
1) Cross-hatching in medians, cross hatching in safety zones separating opposing traffic flows, crosswalk stripes, safety markings, centerlines, edge lines along left edge of one-way roadway or one-way ramp.

d. Blue And White:
1) In parking spaces specifically designated as reserved for disabled.

e. Red:
1) Fire lanes, no parking zones, special raised pavement markers that are placed to be visible to "wrong-way" drivers.

4. Type Two Acceptable Products:
a. Any product meeting design criteria of this specification as approved by Architect/Owner's Representative before application. See Section 01 6200.

PART 3 EXECUTION

3.01 PREPARATION

A. Acrylic Paint:
1. Asphalt Surfaces:
a. Do not apply paint until asphalt has cooled.
b. Allow new seal coated surfaces to cure for at least twenty-four (24) hours before applying paint.
2. Concrete Surfaces:
a. Do not apply paint to new concrete surfaces until concrete has cured seven (7) days minimum.

B. Surfaces shall be dry and free of grease and loose dirt particles.
1. Scrape and wire brush chipped, peeling, or damaged paint on existing curbs.

C. Perform layout with chalk or lumber crayon only.

3.02 APPLICATION

A. General:
   1. Mix in accordance and apply as per Manufacturer's instructions.
   2. Apply at locations and to dimensions and spacing as shown on Contract Drawings.

B. Tolerances:
   1. General: Make lines parallel, evenly spaced, and with sharply defined edges.
   2. Line Widths:
      a. Plus or minus 1/4 inch variance on straight segments.
      b. Plus or minus 1/2 inch variance on curved alignments.

C. Coverage:
   1. Paint stripes added to new asphalt and concrete surfaces:
      a. Apply single coat.
   2. Paint stripes applied to existing asphalt and concrete surfaces:
      a. Apply single coat to existing asphalt parking lots which are being re-striped and where no surface treatments are being applied to asphalt.
      b. Apply single coat to existing concrete parking lots which are being re-striped.
      c. Apply single coat to existing concrete curbs.
   3. Paint stripes applied to new asphalt paving surface treatment over existing asphalt paving.
      a. Except for slurry seal:
         1) Apply single coat after seal coat has completely dried.
      b. Slurry seal coat:
         1) Apply first coat after seal coat has completely dried.
         2) Apply second coat after first coat has thoroughly dried and then wait thirty (30) to forty-five (45) days and after ravel sweeping to apply second coat.
   4. Apply traffic paint at rate of 13 to 15 mils minimum wet thickness, 8 to 9 mils dry thickness. Application at more than 15 mils may result in extended dry times and may cause lifting or cracking on some asphalt surfaces.

3.03 FIELD QUALITY CONTROL

A. Non-Conforming Work:
   1. Replace or correct defective material not conforming to requirements of this specification or any work performed that is of inferior quality at no cost to Owner.

3.04 CLEANING

A. General:
   1. Remove drips, overspray, improper markings, and paint material tracked by traffic by sand blasting, wire brushing, or other method approved by Architect/Owner’s Representative before performance.

B. Waste Management:
   1. Remove debris resulting from work of this Section. Dispose of or recycle all trash and excess material in manner conforming to current EPA regulations and local laws.

END OF SECTION

SECTION 32 9223
SODDING

PART 1 GENERAL

1.01 SUMMARY

A. Includes But Not Limited To:
   1. Furnish and install sodded lawn as described in Contract Documents.

1.02 REFERENCES

A. TPI (SPEC) Certificate: Certify grass species and location of sod source.

1.03 SUBMITTALS

A. Submittals for Information:
   1. Sod Seed Mix:
      a. Written certification confirming sod seed mix and quality:
         1) Include species used.
         2) Include supplier name and contact information.

B. Submittals for Closeout:
   1. Operations And Maintenance Data:
      a. Sod Seed Mix.
   2. Landscape Management Plan (LMP):
      a. Landscape Section:
         1) Sod Seed Mix.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery And Approval Requirements:
   1. Harvest, deliver, store, and handle sod in accordance with requirements of Turfgrass Producers International (TPI) (formally American Sod Producers Association) Specifications for Turfgrass Sod Materials and Transplanting / Installing.
   2. Schedule deliveries to coincide with topsoil operations and laying. Keep storage at job site to minimum without causing delays.
      a. Deliver, unload, and store sod on pallets within 24 hours of being lifted.
      b. Do not deliver small, irregular, or broken pieces of sod.

B. Storage And Handling Requirements:
   1. Cut sod in pieces approximately 3/4 to one inch (19 to 25 mm) thick. Roll or fold sod so it may be lifted and handled without breaking or tearing and without loss of soil.
   2. During wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling.
   3. During dry weather, protect sod from drying before installation. Water as necessary to insure vitality and to prevent excess loss of soil in handling. Sod that dries out before installation will be rejected.

PART 2 PRODUCTS

2.01 MATERIALS

A. Description:
   1. Superior sod grown from certified, high quality, seed of known origin or from plantings of certified grass seedlings or stolons:
      a. Assure satisfactory genetic identity and purity.
      b. Assure over-all high quality and freedom from noxious weeds or an excessive amount of other crop and weedy plants at time of harvest.
   2. Sod shall be composed of three separate varieties. Varieties should include the following attributes:
      a. High traffic tolerance.
      b. Superior color.

c. Low-water requirement.
d. Drought tolerance.

PART 3 EXECUTION

3.01 INSTALLATION

A. Interface With Other Work:
1. Do not commence work of this Section until work of Sections 32 9122 and 32 9300 has been completed and approved.

B. Tolerances:
1. Final grade of soil after sodding of lawn areas is complete shall be one inch (25 mm below top of adjacent pavement of any kind.

C. Laying of Sod:
1. Lay sod during growing season and within 48 hours of being lifted.
2. Lay sod while top 6 inches (150 mm) of soil is damp, but not muddy. Sodding during freezing temperatures or over frozen soil is not acceptable.
3. Lay sod in rows perpendicular to slope with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife.
4. Lay sod flush with adjoining existing sodded surfaces.
5. Do not sod slopes steeper than 3:1. Consult with Architect for alternate treatment.

D. After Laying of Sod Is Complete:
1. Roll horizontal surface areas in two directions perpendicular to each other.
2. Repair and re-roll areas with depressions, lumps, or other irregularities. Heavy rolling to correct irregularities in grade will not be permitted.
3. Water sodded areas immediately after laying sod to obtain moisture penetration through sod into top 6 inches (150 mm) of topsoil.

3.02 FIELD QUALITY CONTROL

A. Field Inspection:
1. Sodded areas will be accepted at Project closeout if:
a. Sodded areas are properly established.
b. Sod is free of bare and dead spots and is without weeds.
c. No surface soil is visible when grass has been cut to height of 2 inches (50 mm).
2. Sodded areas have been mowed a minimum of twice.

END OF SECTION