PROJECT MANUAL
VOLUME 1
BIDDING SET

FOR

New Addition
Town Of Washington
Eau Claire, Wisconsin 54701

Project No. 22108
February 24, 2023

By:

ARCHITECTURE & STRUCTURE
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INVITATION TO BID

PROJECT INFORMATION

Notice to Bidders: Bidders are invited to submit bids for Project as described in this Document.

Project Identification: **New Addition, Town of Washington**
Project Location: **5750 Old Town Hall Road, Eau Claire, WI 54701**
Architect: **Lien & Peterson Architects, Inc.**, **4675 Royal Drive**, **Eau Claire**, **WI 54701**
Architect Project Number: **22108**

Project Description:

In general, the work primarily consists of construction a 1,500 square foot conference room addition to the existing building. The addition will consist of masonry bearing walls, bar joist and metal deck roofing, steel support framing and new finishes. Also included is a new parking lot to the west of the building and repaving the parking lot to the north of the building. The adhered EPDM roof over the office area is to be replaced. Mechanical work includes new ductwork and system rebalance. Electrical work includes new power and lighting. Plumbing work includes new roof drain and leaders.

Pre-bid Tour: A formal tour will not be schedule but bidders are encourage to visit the project site at their convenience.

BID SUBMITTAL AND OPENING

The Owner will receive bids as indicated below:

Bid Date: Tuesday, March 14, 2023.
Bid Time: 1:00 p.m., local time.
Location: Town of Washington, 5750 Old Town Road, Eau Claire, WI 54701
Bids will be thereafter **publicly** opened.

All questions are due Monday, March 6, 2023. An addenda will be issued the following day.
Direct all question to Lien & Peterson Architects, admin@2dlp.com.

Bids shall be mailed, hand delivered, or emailed to henning@townofwashington.wi.gov

DOCUMENTS

Online Procurement of Contracting Documents: Obtain access after February 24, 2023 through any of the following site: La Crosse Builders Exchange, Northwest Regional Builders Exchange, L&P Plan Page

TIME OF COMPLETION

Bidders shall begin the Work on receipt of the Notice to Proceed.

BIDDER'S QUALIFICATIONS

Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work.

INTERPRETATION

No verbal explanation or instructions will be given in regard to the meaning of the drawings or specifications during the bid period. Bidders shall bring inadequacies, omissions, or conflicts to the Architect/Engineer's attention at least ten (10) business days before the date set for bid opening. Prompt clarification will be supplied to all bidders of record by addendum.

Failure to so request clarification or interpretation of the drawings and specifications will not relieve the successful Bidder of responsibility. Signing of the contract will be considered as implicitly denoting that

the Contractor has thorough understanding of the scope of work and comprehension of the contract documents.

END OF SECTION

SECTION 00 21 00
INSTRUCTIONS TO BIDDERS

DEFINITIONS

Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the invitation to bid, Instructions to Bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, and all Addenda.

Addenda are written or graphic instruments issued prior to Bid Deadline which modify or interpret the bidding documents, including Drawings and Specifications, by addition, deletion, clarification and/or correction. Addenda become part of the Contract Documents.

A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

The terms, Architect and A/E shall mean Lien & Peterson Architects, Inc.

BIDDERS REPRESENTATION

Each bidder by making his bid represents that he has read and understands the bidding documents and that he has visited the site and familiarized himself with the local conditions under which the Work is to be performed.

BIDDING PROCEDURES

All bids must be prepared on the form provided in this Project Manual and submitted in accordance with the Instructions to Bidders. **REMOVE FORM FROM PROJECT MANUAL**. Do not submit entire project manual. Submit only one Bid Form. Bid shall be completed in accordance with the requirements stated in this section. Place bid in an opaque envelope and seal. No other information shall be included with the Bid Form except any required bond or information requested herein or by Addendum. Mark the exterior of the envelope as follows:

CONTRACTORS PROPOSAL
(Give Project Name)
(State Portion of the Work Bid Upon)
(Contractor's Name and Address)

No bidder shall modify, withdraw, or cancel his bid or any part thereof for thirty (30) days after the Bid Deadline.

A bid is invalid if it has not been deposited at the designated location prior to the Bid Deadline. Such a bid will not be opened and will be returned to the bidder.

Bids will be received for contracts as provided in the Bid/Proposal form.

ADDENDA

Addenda will be made available through the same online platform as the Bid Documents.

EXAMINATION OF BIDDING DOCUMENTS

Each bidder shall examine the bidding documents carefully and, not later than seven (7) days prior to the date for receipt of bids, shall make requests to the A/E for interpretation or correction of any ambiguity, inconsistency or error therein. Any interpretation or correction will be issued as an Addendum. Only a written interpretation or correction by Addendum shall be binding. No bidder shall rely upon any interpretation or correction given by any other method.

BID GUARANTEE

Provide a certified check, a cashier's check, or a bid bond, payable to the owner in an amount not less than five percent (5%) of the maximum bid with each bid as a guarantee. If the bid is accepted, the bidder will execute and deliver the proposed contract and bonds within ten (10) days after being notified in writing to do so.

If the successful bidder executes and delivers the contract and bond, the bid guarantee will be returned to him. If the bidder fails to furnish such contract and bond, the bid guarantee shall be forfeited to the owner as liquidated damages.

The company issuing the bid bond shall be licensed to do business in the State of Wisconsin. Bid Bond may be submitted on AIA document A310, Bid Bond, latest edition.

INSURANCE REQUIREMENTS

The Contractor shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication coverage, theft, vandalism and malicious mischief.

SUBSTITUTIONS

Each bidder represents that his bid is based upon the materials and equipment described in the bidding documents.

No substitution will be considered unless written request has been submitted to the A/E for approval at least ten (10) days prior to the date for receipt of bids. Each such request shall include a complete description of the proposed substituted, drawings, cuts, performance and test data and any other data or information necessary for a complete evaluation. Approval of substitutions will be set forth by Addendum.

Approval by the A/E of a manufacturer for specified items shall not be deemed as approval of all products or models that the manufacturer can furnish but only the single product which most closely duplicates the item originally specified.

The responsibility for all revisions to the work required by substitutions shall be borne solely by the Contractor who utilizes the substitution, including the following:

- Additional work by other Contractors.
- Changes to the building structure or room sizes.
- Additional associated devices, connections, wiring, etc.
- Properly notifying other contractors as to the effect of such substitutions on their contract.

PRODUCT OR MATERIAL AVAILABILITY

Prior to the receipt of bids, verify that all specified items, products, materials, etc., will be available for timely inclusion in the work. Should any item not be available, notify the A/E. Extra costs resulting from delays caused by failure to determine availability of specified items shall be borne by the Contractor.

QUALIFICATION OF BIDDERS

Before the award of any contract, the owner shall be satisfied that the bidder, (1) maintains a permanent place of business, (2) has adequate equipment to do the work properly, (3) has a suitable financial status to meet obligations incident to the work, (4) has appropriate technical experience, and (5) has satisfactorily completed contracts of similar nature and magnitude.

AWARD OR REJECTION OF BIDS

Review the Bid Form for procedures to be followed should the bid be accepted by the Owner. Notice that prompt delivery of the required documents is required. The bidder acknowledges the right of the Owner to reject any or all bids and to waive any informality or irregularity in any bid received. In addition, the bidder recognizes the right of the Owner to reject a bid if the bidder failed to furnish any required bid security, or to submit the data required by the bidding documents, or if the bid is in any way incomplete or irregular.

SUBMISSION OF POST-BID INFORMATION

Upon request by the A/E, the selected bidder shall within seven (7) days thereafter submit the following:

A statement of costs for each major item of Work included in the bid.
A designation of the Work to be performed by the bidder with his own forces.
A list of names of the Subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

PERFORMANCE BOND AND PAYMENT BOND

The Bidder who is awarded the work shall furnish and pay for bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder in such form as the Owner may prescribe and with such sureties secured through the bidder's usual sources as may be agreeable to the parties. The amount of each bond shall be 100% of the Contract Amount. Bonds shall be dated not later than the date of execution of the Contract. The attorney-in-fact who executes the required bonds on behalf of the surety shall affix thereto a certified and current copy of his power-of-attorney indicating the limit of such power.

Bond form shall be AIA Document WIS. A311, latest edition, "Private Improvement Performance Bond" and "Private Improvement Labor and Material Payment Bond."

ALTERNATE BIDS

If alternate bids are requested, bidder shall state the amount to be added to or deducted from the base bid for making the changes required under each alternate. The stated sum stated sum shall include all incidental work and adjustments as may be necessary or required to fully complete the alternate work. Refer to Section 01 23 00 Alternates. Space is provided on the bid form for alternates. If there is no price change, the bidder shall state "NO CHANGE".

UNIT PRICES

Unit prices requested on the Bid Form shall be given and, if included in the Contract, will be used for additions to or deductions from amount of work required under the Contract. Unit prices shall include all costs of materials, labor, insurance, taxes, overhead and profit. The Owner reserves the right to reject any unit prices as given in the bid if they are considered excessive or unreasonable, or to accept any or all of the unit prices that may be considered fair and reasonable.

RETAINAGE

Retainage will be accumulated at 10% of the amount due until 50% completion. Upon substantial completion, payments shall be increased to 98% of the amount due, less allowance for incomplete and unsatisfactory work.

END OF SECTION

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SECTION 00 41 13
BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

BID INFORMATION

Bidder: _____.
Project Identification: **New Addition, Town of Washington**
Project Location: **5750 Old Town Hall Road, Eau Claire, WI 54701**
Architect: **Lien & Peterson Architects, Inc.**, **4675 Royal Drive**, **Eau Claire**, **WI 54701**
Architect Project Number: **22108**

CERTIFICATIONS AND BASE BID

Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by **Lien and Peterson Architects, Inc.** and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

_____ Dollars ($_____).

BID GUARANTEE

The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 10 days after a written Notice of Award, if offered within 60 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:

_____ Dollars ($_____).

In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

SUBCONTRACTORS AND SUPPLIERS

The following companies shall execute subcontracts for the portions of the Work indicated:

Concrete Work: _____.

Plumbing Work: _____.

HVAC Work: _____.

Electrical Work: _____.

TIME OF COMPLETION

Bidders shall begin the Work on receipt of the Notice to Proceed.

ACKNOWLEDGMENT OF ADDENDA

The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

Addendum No. 1, dated _____.

Addendum No. 2, dated _____.

Addendum No. 3, dated _____.

Addendum No. 4, dated _____.

CONTRACTOR'S LICENSE

The undersigned further states that it is a duly licensed contractor, for the type of work proposed, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

SUBMISSION OF BID

Respectfully submitted this _____ day of _____, 2023.

Submitted By:_____(Name of bidding firm or corporation).

Authorized Signature:_____(Handwritten signature).

Signed By:_____(Type or print name).

Title:_____(Owner/Partner/President/Vice President).

Witnessed By:_____(Handwritten signature).

Attest:_____(Handwritten signature).

By:_____(Type or print name).

Title:_____(Corporate Secretary or Assistant Secretary).

Street Address:_____.

City, State, Zip:_____.

Phone:_____.

License No.:_____.

Federal ID No.:_____(Affix Corporate Seal Here).

END OF DOCUMENT

SECTION 01 10 00
SUMMARY

PART 1 - GENERAL

SUMMARY

Section Includes:

- Project information.
- Work covered by Contract Documents.
- Work under separate contracts.
- Access to site.
- Coordination with occupants.
- Work restrictions.
- Specification and Drawing conventions.

Related Requirements:

- Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

PROJECT INFORMATION

Project Identification: **New Addition, Town of Washington**
Project Location: **5750 Old Town Hall Road, Eau Claire, WI 54701**
Architect: **Lien & Peterson Architects, Inc., 4675 Royal Drive, Eau Claire, WI 54701**
Architect Project Number: **22108**
Architect: **William Boettcher, (715) 835-7500, billb@2dlp.com**.

WORK COVERED BY CONTRACT DOCUMENTS

The Work of Project is defined by the Contract Documents and consists of the following:

- In general, the work primarily consists of construction three new tenant units. All three units will have a kitchen, living room, toilet room, and two bedrooms. A storage room will also be renovated into three smaller storage spaces.

ACCESS TO SITE

General: Each Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

- Driveways, Walkways, and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

COORDINATION WITH OCCUPANTS

Partial Owner Occupancy: Owner will occupy adjacent building on the premises during the construction period.

WORK RESTRICTIONS

Work Restrictions, General: Comply with restrictions on construction operations.

- Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

On-Site Work Hours:
Limit work to normal business working hours, as governed by local ordinances, Monday through Friday, unless otherwise indicated.

Existing Utility Interruptions:
Notify Construction Manager, Owner not less than two days in advance of proposed utility interruptions.

Restricted Substances: Use of tobacco products and other controlled substances within the existing building on Project site is not permitted.

SPECIFICATION AND DRAWING CONVENTIONS

Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
Specification requirements are to be performed by Contractor unless specifically stated otherwise.

Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 - GENERAL

SUMMARY

Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

SCHEDULE OF VALUES

Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

- Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
- Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

- Arrange schedule of values consistent with format of AIA Document G703.
- Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

APPLICATIONS FOR PAYMENT

Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

- Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
- Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
- Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following if not already provided:

- List of subcontractors.
- Schedule of values.
- Contractor's construction schedule (preliminary if not final).
- List of Contractor's principal consultants.
- Copies of building permits.
- Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
- Certificates of insurance and insurance policies.
- Performance and payment bonds.

Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

- Evidence of completion of Project closeout requirements.
- Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
- Updated final statement, accounting for final changes to the Contract Sum.
- AIA Document G706.
- AIA Document G706A.
- AIA Document G707.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

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

SUMMARY
Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

- General coordination procedures.
- Coordination drawings.
- RFIs.
- Digital project management procedures.
- Project meetings.

DEFINITIONS
BIM: Building Information Modeling.

RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

INFORMATIONAL SUBMITTALS
Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

- Name, address, telephone number, and email address of entity performing subcontract or supplying products.
- Number and title of related Specification Section(s) covered by subcontract.
- Drawing number and detail references, as appropriate, covered by subcontract.

GENERAL COORDINATION PROCEDURES
Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

- Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
- Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
- Make adequate provisions to accommodate items scheduled for later installation.

Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

- Preparation of Contractor's construction schedule.
- Preparation of the schedule of values.
- Installation and removal of temporary facilities and controls.
- Delivery and processing of submittals.

Progress meetings.
Pre-installation conferences.
Project closeout activities.
Startup and adjustment of systems.

COORDINATION DRAWINGS

Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

Coordination Drawing Organization: Organize coordination drawings as follows:

Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
Structural Penetrations: Indicate penetrations and openings required for all disciplines.
Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.

REQUEST FOR INFORMATION (RFI)

General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

All RFI’s shall be submitted to the Construction Manager for initial processing. Architect will return without response those RFIs submitted to Architect by entities other than the Construction Manager.
Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

Project name.
Project number.
Date.
Name of Contractor.
Name of Architect.
RFI number, numbered sequentially.

RFI subject.
Specification Section number and title and related paragraphs, as appropriate.
Drawing number and detail references, as appropriate.
Field dimensions and conditions, as appropriate.
Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
Contractor's signature.
Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
Name file with submittal number or other unique identifier, including revision identifier.
Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

PROJECT MEETINGS

General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect.

Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
Agenda: Discuss items of significance that could affect progress, including the following:

Responsibilities and personnel assignments.
Tentative construction schedule.
Critical work sequencing and long lead items.
Designation of key personnel and their duties.
Lines of communications.
Procedures for processing field decisions and Change Orders.
Procedures for RFIs.
Procedures for testing and inspecting.
Procedures for processing Applications for Payment.
Distribution of the Contract Documents.
Submittal procedures.
Use of the premises and existing building.
Work restrictions.
Working hours.
Owner's occupancy requirements.
Responsibility for temporary facilities and controls.
Procedures for moisture and mold control.
Procedures for disruptions and shutdowns.
Construction waste management and recycling.
Parking availability.
Office, work, and storage areas.
Equipment deliveries and priorities.
First aid.
Security.

Progress cleaning.

Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

Pre-installation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Commissioning Authority of scheduled meeting dates.

Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

Contract Documents.
Options.
Related RFIs.
Related Change Orders.
Purchases.
Deliveries.
Submittals.
Sustainable design requirements.
Review of mockups.
Possible conflicts.
Compatibility requirements.
Time schedules.
Weather limitations.
Manufacturer's written instructions.
Warranty requirements.
Compatibility of materials.
Acceptability of substrates.
Temporary facilities and controls.
Space and access limitations.
Regulations of authorities having jurisdiction.
Testing and inspecting requirements.
Installation procedures.
Coordination with other work.
Required performance results.
Protection of adjacent work.
Protection of construction and personnel.

Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

Progress Meetings: Conduct progress meetings at regular intervals.

Coordinate dates of meetings with preparation of payment requests.

Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

Review schedule for next period.

Review present and future needs of each entity present, including the following:

Interface requirements.
Sequence of operations.
Status of submittals.
Status of sustainable design documentation.
Deliveries.
Off-site fabrication.
Access.
Site use.
Temporary facilities and controls.
Progress cleaning.
Quality and work standards.
Status of correction of deficient items.
Field observations.
Status of RFIs.
Status of Proposal Requests.
Pending changes.
Status of Change Orders.
Pending claims and disputes.
Documentation of information for payment requests.

Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

SUMMARY
Section Includes:

- Submittal schedule requirements.
- Administrative and procedural requirements for submittals.

DEFINITIONS
Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

SUBMITTAL FORMATS
Submittal Information: Include the following information in each submittal:

- Project name.
- Date.
- Name of Architect.
- Name of Contractor.
- Names of subcontractor, manufacturer, and/or supplier.
- Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
- Category and type of submittal.
- Submittal purpose and description.
- Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
- Drawing number and detail references, as appropriate.
- Indication of full or partial submittal.
- Other necessary identification.
- Remarks.

Options: Identify options requiring selection by Architect.

Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number. Email submittal to admin@2dlp.com

SUBMITTAL PROCEDURES
Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

- Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

- Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
- Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

SUBMITTAL REQUIREMENTS

Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

- If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
- Mark each copy of each submittal to show which products and options are applicable.
- Include the following information, as applicable:
  - Manufacturer's catalog cuts.
  - Manufacturer's product specifications.
  - Standard color charts.
  - Statement of compliance with specified referenced standards.
  - Testing by recognized testing agency.
  - Application of testing agency labels and seals.
  - Notation of coordination requirements.
  - Availability and delivery time information.
- For equipment, include the following in addition to the above, as applicable:
  - Wiring diagrams that show factory-installed wiring.
  - Printed performance curves.
  - Operational range diagrams.
  - Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- Submit Product Data before Shop Drawings, and before or concurrent with Samples.

Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

- Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
  - Identification of products.
  - Schedules.
  - Compliance with specified standards.

Notation of coordination requirements.
Notation of dimensions established by field measurement.
Relationship and attachment to adjoining construction clearly indicated.
Seal and signature of professional engineer if specified.

Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
Paper Transmittal: Include paper transmittal including complete submittal information indicated.
Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

CONTRACTOR'S REVIEW

Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

ARCHITECT'S REVIEW

Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.

PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

Architect will discard submittals received from sources other than Contractor.

Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

SUMMARY

Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

Related Requirements:

Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

USE CHARGES

General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

Water and Sewer Service from Existing System: Provide connections and extensions of services as required for construction operations, coordinate installation of temporary and new metering.

Electric Power Service from Existing System: Provide connections and extensions of services as required for construction operations, coordinate installation of temporary and new metering.

INFORMATIONAL SUBMITTALS

Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

Moisture-and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.

QUALITY ASSURANCE

Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

PROJECT CONDITIONS

Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

TEMPORARY FACILITIES
Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Owner will provide a field office for contractor use.

DUMPSTERS
Construction Manager and owner will provide necessary dumpsters for construction waste disposal.

EQUIPMENT
Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

TEMPORARY FACILITIES, GENERAL
Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

INSTALLATION, GENERAL
Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

TEMPORARY UTILITY INSTALLATION
General: Install temporary service or connect to existing service.

Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

SECURITY AND PROTECTION FACILITIES INSTALLATION
Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

OPERATION, TERMINATION, AND REMOVAL

Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

Maintenance: Maintain facilities in good operating condition until removal.

Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.

At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION

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SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

SUMMARY

Section includes administrative and procedural requirements for the following:

- Salvaging nonhazardous demolition and construction waste.
- Recycling nonhazardous demolition and construction waste.
- Disposing of nonhazardous demolition and construction waste.

Related Requirements:

- Section 04 20 00 "Unit Masonry" for disposal requirements for masonry waste.

DEFINITIONS

Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.

Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

QUALITY ASSURANCE

Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination."

WASTE MANAGEMENT PLAN

General: Develop a waste management plan according to requirements in this Section.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

General: Review with Owner and Architect what items will be salvaged, recycled, or disposed of.

PART 3 - EXECUTION

PLAN IMPLEMENTATION

General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

SALVAGING DEMOLITION WASTE

Comply with requirements in Section 02 41 19 "Selective Demolition" for salvaging demolition waste.

Salvaged Items for Owner's Use:

Clean salvaged items.
Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
Store items in a secure area until delivery to Owner.
Protect items from damage during transport and storage.

RECYCLING WASTE, GENERAL

General: Recycle paper and beverage containers used by on-site workers.

Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

RECYCLING DEMOLITION WASTE

Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

Metals: Separate metals by type.

Structural Steel: Stack members according to size, type of member, and length.
Remove and dispose of bolts, nuts, washers, and other rough hardware.

Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.

Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

Conduit: Reduce conduit to straight lengths and store by material and size.

Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

RECYCLING CONSTRUCTION WASTE

Packaging:

Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

Polystyrene Packaging: Separate and bag materials.

Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

Wood Materials:

Clean Cut-Offs of Lumber: Grind or chip into small pieces.

Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

DISPOSAL OF WASTE

General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.

Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.

Burning: Do not burn waste materials.

END OF SECTION

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SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 - GENERAL

SUMMARY

Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

- Substantial Completion procedures.
- Final completion procedures.
- Warranties.
- Final cleaning.
- Repair of the Work.

ACTION SUBMITTALS

Product Data: For each type of cleaning agent.

Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

Certified List of Incomplete Items: Final submittal at final completion.

CLOSEOUT SUBMITTALS

Certificates of Release: From authorities having jurisdiction.

Certificate of Insurance: For continuing coverage.

Field Report: For pest control inspection.

SUBSTANTIAL COMPLETION PROCEDURES

Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

- Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
- Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
- Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
- Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
- Submit testing, adjusting, and balancing records.
- Submit sustainable design submittals not previously submitted.
- Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

- Advise Owner of pending insurance changeover requirements.
- Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
- Complete startup and testing of systems and equipment.
- Perform preventive maintenance on equipment used prior to Substantial Completion.
- Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 79 00 "Demonstration and Training."
- Advise Owner of changeover in utility services.
- Participate with Owner in conducting inspection and walkthrough with local emergency responders.
- Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
- Complete final cleaning requirements.
- Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

FINAL COMPLETION PROCEDURES

Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

- Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
- Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
- Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- Submit pest-control final inspection report.

Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

LIST OF INCOMPLETE ITEMS (PUNCH LIST)

Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

- Organize list of spaces in sequential order, starting with exterior areas first.
- Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
- Submit list of incomplete items in the following format:

PDF electronic file. Architect will return annotated file.

SUBMITTAL OF PROJECT WARRANTIES

Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

Submit on digital media acceptable to Architect.

Warranties in Paper Form:

Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

MATERIALS

Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

FINAL CLEANING

General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

Cleaning: Clean each surface or unit, comply with manufacturer's written instructions.

Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
Sweep concrete surfaces.
Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
Leave Project clean.

Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.

Construction Waste Disposal: Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."

REPAIR OF THE WORK

Complete repair and restoration operations, before requesting inspection for determination of Substantial Completion.

Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

SUMMARY

Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

- Operation and maintenance documentation directory manuals.
- Systems and equipment operation manuals.
- Systems and equipment maintenance manuals.
- Product maintenance manuals.

CLOSEOUT SUBMITTALS

Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

Format: Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.

Final Manual Submittal: Submit (2) Two manuals in final form prior to requesting inspection for Substantial Completion before commencing demonstration and training.

- Correct or revise each manual to comply with Architect's comments.

Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

FORMAT OF OPERATION AND MAINTENANCE MANUALS

Manuals, Electronic File (1) One File: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

- Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
- File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

Manuals, Paper Copies (2) Two Bound Books: Submit manuals in the form of hard-copy, bound and labeled volumes.

- Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
- Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

OPERATION MANUALS

Systems and Equipment Operation: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

Systems and Equipment Maintenance: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

Product Maintenance: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 79 00
DEMONSTRATION AND TRAINING

PART 1 - GENERAL

SUMMARY

Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

Instruction in operation and maintenance of systems, subsystems, and equipment.

QUALITY ASSURANCE

Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination."

COORDINATION

Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

INSTRUCTION PROGRAM

Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

INSTRUCTION

Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final Operation and Maintenance Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 02 41 19
SELECTIVE DEMOLITION

PART 1 - GENERAL

SUMMARY
Section Includes:
Demolition and removal of selected portions of building or structure.
Salvage of existing items to be reused or recycled.

MATERIALS OWNERSHIP
Unless otherwise indicated, demolition waste becomes property of Contractor.

Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

Carefully salvage in a manner to prevent damage and promptly return to Owner.

PREINSTALLATION MEETINGS
Predemolition Conference: Conduct conference at Project site.

INFORMATIONAL SUBMITTALS
Proposed Protection Measures: Submit report if requested by Owner, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

Pre-demolition photographs or video for Contractors records.

CLOSEOUT SUBMITTALS
Inventory of items that have been removed and salvaged.

FIELD CONDITIONS
Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

Storage or sale of removed items or materials on-site is not permitted.

Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

Maintain fire-protection facilities in service during selective demolition operations.

Arrange selective demolition schedule so as not to interfere with Owner's operations.

WARRANTY
Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

EXAMINATION

Verify that utilities have been disconnected and capped before starting selective demolition operations.

Inventory and record the condition of items to be removed and salvaged.

UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

Arrange to shut off utilities with utility companies.

If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.

Equipment to Be Removed: Disconnect and cap services and remove equipment.

Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

PROTECTION

Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

Remove temporary barricades and protections where hazards no longer exist.

SELECTIVE DEMOLITION

General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

Maintain fire watch during and for at least <**Insert number**> hours after flame-cutting operations.

Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

Dispose of demolished items and materials promptly.

Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

Removed and Salvaged Items:

Clean salvaged items.

Pack or crate items after cleaning. Identify contents of containers.

Store items in a secure area until delivery to Owner.

Transport items to Owner's storage area designated by Owner.

Protect items from damage during transport and storage.

Removed and Reinstalled Items:

Clean and repair items to functional condition adequate for intended reuse.

Pack or crate items after cleaning and repairing. Identify contents of containers.

Protect items from damage during transport and storage.

Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

CLEANING

Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

Do not allow demolished materials to accumulate on-site.

Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

Burning: Do not burn demolished materials.

Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

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SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

SUMMARY
Section includes cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

ACTION SUBMITTALS
Product Data: For each type of product.
Design Mixtures: For each concrete mixture.

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

PART 2 - PRODUCTS

CONCRETE, GENERAL
Comply with ACI 301 and ACI 117.

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

Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

CONCRETE MATERIALS
Cementitious Materials:

- Portland Cement: ASTM C 150/C 150M, Type I.
- Fly Ash: ASTM C 618, Class C or F.
- Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
- Blended Hydraulic Cement: ASTM C 595/C 595M, Type IS, portland blast-furnace slag cement.

Normal-Weight Aggregate: ASTM C 33/C 33M, 1-1/2-inch nominal maximum aggregate size.

Air-Entraining Admixture: ASTM C 260/C 260M.

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

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

Water: ASTM C 94/C 94M.

RELATED MATERIALS

Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick; or plastic sheet, ASTM E 1745, Class C.

Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

CURING MATERIALS

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

Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.

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

Water: Potable.

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

CONCRETE MIXTURES

Normal-Weight Concrete:

Minimum Compressive Strength: 4000 psi at 28 days.
Maximum W/C Ratio: 0.50.
Slump Limit: 5 inches, plus or minus 1 inch.
Air Content: Maintain within range permitted by ACI 301. Do not allow air content of trowel-finished floor slabs to exceed 3 percent.

CONCRETE MIXING

Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116, and furnish batch ticket information.

When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

FORMWORK INSTALLATION

Design, construct, erect, brace, and maintain formwork according to ACI 301.

EMBEDDED ITEM INSTALLATION

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

VAPOR-RETARDER INSTALLATION

Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.

Lap joints 6 inches and seal with manufacturer's recommended adhesive or joint tape.

STEEL REINFORCEMENT INSTALLATION

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

Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

JOINTS

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

Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness

Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

CONCRETE PLACEMENT

Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

Do not add water to concrete during delivery, at Project site, or during placement.

Consolidate concrete with mechanical vibrating equipment according to ACI 301.

FINISHING UNFORMED SURFACES

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

Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.

Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

CONCRETE PROTECTING AND CURING

General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 305.1 for hot-weather protection during curing.

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

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

Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:

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

Water.

Continuous water-fog spray.

Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

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

Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 - GENERAL

SUMMARY

Section Includes:

- Concrete masonry units.
- Lintels.
- Mortar and grout materials.
- Reinforcement.
- Ties and anchors.
- Embedded flashing.
- Accessories.
- Mortar and grout mixes.

PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS

Product Data: For each type of product.

Shop Drawings: For reinforcing steel: Indicate bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315R.

Samples: For each type and color of exposed masonry unit and colored mortar.

INFORMATIONAL SUBMITTALS

Material Certificates: For each type and size of product and for masonry units, include data on material properties.

Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.

FIELD CONDITIONS

Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.

Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

PART 2 - PRODUCTS

UNIT MASONRY, GENERAL

Masonry Standard: Comply with TMS 602, except as modified by requirements in the Contract Documents.

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

Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

CONCRETE MASONRY UNITS

Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

Integral Water Repellent: Provide units made with integral water repellent for exposed units.

CMUs: ASTM C90, normal weight unless otherwise indicated.

Concrete Face Brick: ASTM C1634, normal weight.

Size (Actual Dimensions): 3-5/8 inches wide by 8-5/8 inches high by 15-5/8 inches long.
Texture: Match Existing Building, ground-face finish and split-face finish.

LINTELS

Solid Concrete Masonry Lintels: ASTM C1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated.

Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

Offset Angle Supports: Steel plate brackets anchored to structure, allowing continuous insulation behind shelf angle supporting veneer. Component and anchor size and spacing engineered by manufacturer.

Carbon Steel, Galvanized after Fabrication: ASTM A1008/A1008M, with ASTM A153/A153M, Class B coating.

MORTAR AND GROUT MATERIALS

Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

Hydrated Lime: ASTM C207, Type S.

Aggregate for Mortar: ASTM C144.
For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture recommended by manufacturer for use in masonry mortar of composition indicated.

Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.

Water: Potable.

REINFORCEMENT

Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

Masonry-Joint Reinforcement, General: ASTM A951/A951M.
Exterior Walls: Hot-dip galvanized carbon steel.
Wire Size for Side Rods: 0.148-inch diameter.

Wire Size for Cross Rods: 0.148-inch diameter.
Wire Size for Veneer Ties: 0.148-inch diameter.
Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
Provide in lengths of not less than 10 ft..

Masonry-Joint Reinforcement for Multiwythe Masonry:
Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections having a maximum horizontal play of 1/16 inch and maximum vertical adjustment of 1-1/4 inches. Size ties to extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.

TIES AND ANCHORS

General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A1064/A1064M, with ASTM A153/A153M, Class B-2 coating.
Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
Steel Plates, Shapes, and Bars: ASTM A36/A36M.

Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

Wire: Fabricate from 1/4-inch- diameter, hot-dip galvanized steel wire.

Partition Top Anchors: 0.105-inch-thick metal plate with a 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.

Corrosion Protection: Hot-dip galvanized to comply with ASTM A153/A153M.

Adjustable Masonry-Veneer Anchors:

General: Provide anchors that allow vertical adjustment but resist a 100 lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.

Fabricate sheet metal anchor sections and other sheet metal parts from 0.0785-inch-thick steel sheet, galvanized after fabrication.

Fabricate wire ties from 0.25-inch- diameter, hot-dip galvanized-steel wire unless otherwise indicated.

Masonry-Veneer Anchors; Vertical Slotted L-Plate: Rib-stiffened, sheet metal anchor section with screw holes at top and bottom, projecting vertical leg with slotted hole for wire tie and washer at face of insulation.

EMBEDDED FLASHING

Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 ft.. Provide splice plates at joints of formed, smooth metal flashing.
Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
Fabricate metal sealant stops from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
Fabricate metal expansion-joint strips from stainless steel to shapes indicated.

Flexible Flashing: Use one of the following unless otherwise indicated:

Self-Adhering, Stainless Steel Fabric Flashing: Composite, flashing product consisting of 2 mil of Type 304 stainless steel sheet, bonded to a layer of polymeric fabric with a butyl adhesive, to produce an overall thickness of 10 mil.

Applications: Use 10-mil-thick flashing at windows, doors, and small wall penetrations; not at base of walls.

Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 30 mil.

Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 35 mil.

Drainage Plane Flashing: Fabricate from rubberized asphalt and drainage membrane to shapes indicated, including weep tabs, termination bar, and drip edge. Provide flashing materials as follows:

Rubberized Asphalt: 40 mil (1.0 mm) thick.

Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

Termination Bars for Flexible Flashing: Rigid PVC bars 1/8 inch by 1 inch.

ACCESSORIES

Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from urethane or PVC.

Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 or PVC, complying with ASTM D2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

Weep/Cavity Vents: Use one of the following unless otherwise indicated:

Wicking Material: Absorbent rope, made from cotton, 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity. Use only for weeps.
Rectangular Plastic Weep/Vent Tubing: Clear butyrate, 3/8 by 1-1/2 by 3-1/2 inches long.

Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected from manufacturer's standard.

Vinyl Weep Hole/Vent: Units made from flexible PVC, designed to fit into a head joint and consisting of a louvered vertical leg, flexible wings to seal against ends of masonry units, and a top flap to keep mortar out of the head joint; in color selected by Architect.

Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

Mortar Deflector: Strips, full depth of cavity and 10 inches high, with dimpled surface that prevent clogging with mortar droppings.

Rainscreen Drainage Mat: Sheets or strips not less than full depth of cavity thick and installed to full height of cavity, with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity to prevent weep holes from clogging with mortar.

MORTAR AND GROUT MIXES

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

Do not use calcium chloride in mortar or grout.

Use portland cement-lime or masonry cement mortar unless otherwise indicated.

Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

Mortar for Unit Masonry: Comply with ASTM C270. Provide the following types of mortar for applications stated unless another type is indicated.

For masonry below grade or in contact with earth, use Type M.

For reinforced masonry, use Type S.

For mortar parge coats, use Type S.

For exterior, above-grade, load-bearing, nonload-bearing walls, and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.

Grout for Unit Masonry: Comply with ASTM C476.

Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602 for dimensions of grout spaces and pour height.

PART 3 - EXECUTION

INSTALLATION, GENERAL

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

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

TOLERANCES

Dimensions and Locations of Elements:

For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

Lines and Levels:

For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft., or 1/2-inch maximum.
For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft., 1/4 inch in 20 ft., or 1/2-inch maximum.
For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft., 3/8 inch in 20 ft., or 1/2-inch maximum.
For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 ft. or 1/2-inch maximum.

Joints:

For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

LAYING MASONRY WALLS

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

Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern matching existing building; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

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

MORTAR BEDDING AND JOINTING

Lay CMUs as follows:

Bed face shells in mortar and make head joints of depth equal to bed joints.
Bed webs in mortar in all courses of piers, columns, and pilasters.
Bed webs in mortar in grouted masonry, including starting course on footings.

Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.

Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

Rake out mortar joints at pre-faced CMUs to a uniform depth of 1/4 inch and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.

Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

COMPOSITE MASONRY

Bond wythes of composite masonry together using one of the following methods:

Individual Metal Ties: Provide ties as indicated installed in horizontal joints, but not less than one metal tie for 4.5 sq. ft. of wall area spaced not to exceed 36 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.

Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.

Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.

Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.

Intersecting and Abutting Walls: Unless vertical expansion or control joints are indicated at juncture, bond walls together as follows:

Provide individual metal ties not more than 16 inches o.c.

CAVITY WALLS

Bond wythes of cavity walls together using one of the following methods:

Individual Metal Ties: Provide ties as indicated installed in horizontal joints, but not less than one metal tie for 4.5 sq. ft. of wall area spaced not to exceed 36 inches o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

Masonry-Joint Reinforcement: Installed in horizontal mortar joints.

Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.

Where bed joints of wythes do not align, use adjustable-type (two-piece-type) reinforcement with continuous horizontal wire in facing wythe attached to ties.

Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

Parge cavity face of backup wythe in a single coat approximately 3/8 inch thick. Trowel face of parge coat smooth.

Installing Cavity Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as indicated.

ANCHORED MASONRY VENEERS

Anchor masonry veneers to concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:

Fasten screw-attached anchors to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.

Embed tie sections in masonry joints.

Locate anchor sections to allow maximum vertical differential movement of ties up and down.

Space anchors as indicated, but not more than 18 inches o.c. vertically and 24 inches o.c. horizontally, with not less than one anchor for each 2 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

MASONRY-JOINT REINFORCEMENT

General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

Space reinforcement not more than 16 inches o.c.

Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.

Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

Provide continuity at wall intersections by using prefabricated T-shaped units.

Provide continuity at corners by using prefabricated L-shaped units.

FLASHING, WEEP HOLES, AND CAVITY VENTS

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

Install flashing as follows unless otherwise indicated:

Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 4 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.

At lintels and shelf angles, extend flashing 6 inches minimum, to edge of next full unit at each end. At heads and sills, extend flashing 6 inches minimum, to edge of next full unit and turn ends up not less than 2 inches to form end dams.

Install metal drip edges with sawtooth sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Section 07 92 00 "Joint Sealants" for application indicated.

Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal flashing termination.

Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.

Use specified weep/cavity vent products or open-head joints to form weep holes.

Space weep holes 24 inches o.c. unless otherwise indicated.

Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.

Place cavity drainage material in airspace behind veneers to comply with configuration requirements for cavity drainage material in "Accessories" Article.

Install cavity vents in head joints in exterior wythes at spacing indicated. Use specified weep/cavity vent products or open-head joints to form cavity vents.

Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

REINFORCED UNIT MASONRY

Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

Placing Reinforcement: Comply with requirements in TMS 602.

Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

Limit height of vertical grout pours to not more than 12.67 ft..

CLEANING

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

Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.

Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

Clean masonry with a proprietary acidic masonry cleaner applied according to manufacturer's written instructions.

MASONRY WASTE DISPOSAL

Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

Do not dispose of masonry waste as fill within 18 inches of finished grade.

Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.

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

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

SUMMARY
Section Includes: Structural steel and Shrinkage-resistant grout.

DEFINITIONS
Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data:
- Structural-steel materials.
- High-strength, bolt-nut-washer assemblies.
- Shear stud connectors.
- Anchor rods.
- Threaded rods.
- Forged-steel hardware.
- Shop primer.
- Galvanized-steel primer.
- Etching cleaner.
- Galvanized repair paint.
- Shrinkage-resistant grout.

Shop Drawings: Show fabrication of structural-steel components.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Comply with applicable provisions of the following specifications and documents:
- ANSI/AISC 303.
- ANSI/AISC 360.
- RCSC's "Specification for Structural Joints Using High-Strength Bolts."

Moment Connections: Type PR, partially or Type FR, fully restrained.

Construction: Combined system of moment frame, braced frame, and shear walls.

STRUCTURAL-STEEL MATERIALS
W-Shapes: ASTM A572/A572M, Grade 50.

Channels, Angles: ASTM A572/A572M, Grade 50.

Plate and Bar: ASTM A572/A572M, Grade 50.

Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade B structural tubing.

Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.

Welding Electrodes: Comply with AWS requirements.

BOLTS AND CONNECTORS

High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.

Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

RODS

Unheaded Anchor Rods: ASTM F1554, Grade 36.

Configuration: Straight.

Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

Headed Anchor Rods: ASTM F1554, Grade 36, straight.

Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

Threaded Rods: ASTM A36/A36M.

Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

FORGED-STEEL STRUCTURAL HARDWARE

Clevises and Turnbuckles: Made from cold-finished carbon-steel bars, ASTM A108, AISI C-1035.

PRIMER

Steel Primer:

SSPC-Paint 23, latex primer.

Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

Galvanized-Steel Primer: MPI#26.

Etching Cleaner: MPI#25, for galvanized steel.

Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

SHRINKAGE-RESISTANT GROUT

Metallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

FABRICATION

Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

Shear Stud Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Weld using automatic end welding of headed-stud shear connectors in accordance with AWS D1.1/D1.1M and manufacturer's written instructions.

SHOP CONNECTIONS

High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.

Joint Type: Pretensioned.

Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

GALVANIZING

Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.

Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

SHOP PRIMING

Shop prime steel surfaces, except the following:

Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.

Surfaces to be field welded.

Surfaces of high-strength bolted, slip-critical connections.

Surfaces to receive sprayed fire-resistive materials (applied fireproofing).

Galvanized surfaces.

Surfaces enclosed in interior construction.

Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

SSPC-SP 2.

SSPC-SP 3.

SSPC-SP 7 (WAB)/NACE WAB-4.

SSPC-SP 6 (WAB)/NACE WAB-3.

Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

PART 3 - EXECUTION

EXAMINATION

Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

Proceed with installation only after unsatisfactory conditions have been corrected.

ERECTION

Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

Set plates for structural members on wedges, shims, or setting nuts as required.

Weld plate washers to top of baseplate.

Pretension anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.

Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

Maintain erection tolerances of structural steel within ANSI/AISC 303.

FIELD CONNECTIONS

High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.

Joint Type: Pretensioned.

Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

END OF SECTION

SECTION 05 21 00
STEEL JOIST FRAMING

PART 1 - GENERAL

SUMMARY

Section Includes:

- K-series steel joists.
- Steel joist girders.
- Steel joist accessories.

ACTION SUBMITTALS

Product Data: For each type of joist, accessory, and product.

Shop Drawings:

- Include layout, designation, number, type, location, and spacing of joists.
- Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.

INFORMATIONAL SUBMITTALS

Welding certificates.

Manufacturer certificates.

Paint compatibility certificates.

Mill Certificates: For each type of bolt.

Field quality-control reports.

PART 2 - PRODUCTS

STEEL JOISTS

K-Series Steel Joist: Manufactured steel joists of type indicated in accordance with "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

Steel Joist Substitutes: Manufacture in accordance with "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

STEEL JOIST GIRDERS

Manufactured joist girders in accordance with "Standard Specification for Joist Girders" in SJI's "Specifications," with steel-angle top- and bottom-chord members; with end and top-chord arrangements as indicated.

PRIMERS

Primer:

SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

STEEL JOIST ACCESSORIES

Bridging:

Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

Schematically indicated. Detail and fabricate in accordance with SJI's "Specifications." Furnish additional erection bridging if required for stability.

Fabricate as indicated on Drawings and in accordance with SJI's "Specifications." Furnish additional erection bridging if required for stability.

Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction.

Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated on Drawings.

High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

Finish: Hot-dip zinc coating, ASTM A153/A153M, Class C.

Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

CLEANING AND SHOP PAINTING

Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.

Apply one coat of shop primer to joists and joist accessories.

PART 3 - EXECUTION

INSTALLATION

Do not install joists until supporting construction is in place and secured.

Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction in accordance with SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.

Before installation, splice joists delivered to Project site in more than one piece.
Space, adjust, and align joists accurately in location before permanently fastening.
Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

Field weld joists to supporting steel bearing plates and framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

Bolt joists to supporting steel framework using carbon-steel bolts.

Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for high-strength structural bolt installation and tightening requirements.

Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

END OF SECTION

SECTION 05 31 00
STEEL DECKING

PART 1 - GENERAL

SUMMARY

Section Includes:

- Roof deck.
- Composite floor deck.
- Noncomposite form deck.

ACTION SUBMITTALS

Product Data:

- Roof deck.
- Composite floor deck.
- Noncomposite form deck.

Shop Drawings:

- Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

INFORMATIONAL SUBMITTALS

Certificates:

- Welding certificates.
- Product Certificates: For each type of steel deck.

Test and Evaluation Reports:

- Product Test Reports: For tests performed by a qualified testing agency, indicating that power-actuated mechanical fasteners comply with requirements.
- Research Reports: For steel deck, from ICC-ES showing compliance with the building code.

DELIVERY, STORAGE, AND HANDLING

Store products in accordance with SDI MOC3. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.

Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.

ROOF DECK

Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:

- Prime-Painted Steel Sheet: ASTM A1008/A1008M, Structural Steel (SS), Grade 40 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
  - Color: Manufacturer's standard.
- Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 40, zinc coating.

Galvanized- and Shop-Primed Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 40, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

Color: Manufacturer's standard.

Deck Profile: Type IR, intermediate rib.

Span Condition: Simple span.

Side Laps: Overlapped or interlocking seam at Contractor's option.

ACCESSORIES

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

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

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

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

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

Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI standards for overhang and slab depth.

Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory-punched hole of 3/8-inch minimum diameter.

Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.

Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch-wide flanges and recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.

Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.

Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

INSTALLATION, GENERAL

Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.

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

Locate deck bundles to prevent overloading of supporting members.

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

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

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

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

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

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

INSTALLATION OF ROOF DECK

Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:

Weld Diameter: 3/4 inch, nominal.

Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 18 inches apart, maximum.

Weld Washers: Install weld washers at each weld location.

Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches, and as follows:

Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.

Mechanically clinch or button punch.

Fasten with a minimum of 1-1/2-inch-long welds.

End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

End Joints: Lapped 2 inches minimum.

Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 inches apart with at least one weld at each corner.

Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.

Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels in accordance with deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.

Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive in accordance with manufacturer's written instructions to ensure complete closure.

REPAIR

Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.

Repair Painting:

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

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

END OF SECTION

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SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

SUMMARY

Section Includes:

Miscellaneous steel framing and supports.

Miscellaneous steel trim.

Products furnished, but not installed, under this Section include the following:

Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

ACTION SUBMITTALS

Product Data: For paint products.

Shop Drawings: Show fabrication and installation details.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

METALS

Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

Stainless-Steel Bars and Shapes: ASTM A 276, Type 304 or Type 316L.

Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

Rolled-Stainless-Steel Floor Plate: ASTM A 793.

Steel Tubing: ASTM A 500/A 500M, cold-formed steel tubing.

Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.

Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

Size of Channels: As indicated.

Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating;

Material: Cold-rolled steel, ASTM A 1008/A 1008M, structural steel, Grade 33;

Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

FASTENERS

General: Unless otherwise indicated, provide Type 304 or Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

Provide stainless-steel fasteners for fastening aluminum.
Provide stainless-steel fasteners for fastening stainless steel.

Post-Installed Anchors: Torque-controlled expansion anchors.

Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

MISCELLANEOUS MATERIALS

Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

FABRICATION, GENERAL

Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

Weld corners and seams continuously to comply with the following:

Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
Obtain fusion without undercut or overlap.
Remove welding flux immediately.

At exposed connections, finish exposed welds and surfaces smooth and blended.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.

Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches from ends and corners of units and 24 inches o.c.

MISCELLANEOUS FRAMING AND SUPPORTS

General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

Fabricate steel girders for wood frame construction from continuous steel shapes of sizes indicated.

Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches o.c.

Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

MISCELLANEOUS STEEL TRIM

Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

Galvanize exterior miscellaneous steel trim.

Prime exterior miscellaneous steel trim with zinc-rich primer.

STEEL WELD PLATES AND ANGLES

Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

LOOSE STEEL LINTELS

Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.

Galvanize loose steel lintels located in exterior walls.

Prime loose steel lintels located in exterior walls with zinc-rich primer.

FINISHES, GENERAL

Finish metal fabrications after assembly.

PART 3 - EXECUTION

INSTALLATION, GENERAL

Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

Field Welding: Comply with the following requirements:

- Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
- Obtain fusion without undercut or overlap.
- Remove welding flux immediately.
- At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

ADJUSTING AND CLEANING

Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 06 10 53
MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

SUMMARY

Section Includes:

- Framing with dimension lumber.
- Rooftop equipment bases and support curbs.
- Wood blocking, cants, and nailers.
- Wood furring and grounds.
- Wood sleepers.

ACTION SUBMITTALS

Product Data: For each type of process and factory-fabricated product.

INFORMATIONAL SUBMITTALS

Evaluation Reports: For the following, from ICC-ES:

- Preservative-treated wood.
- Power-driven fasteners.

PART 2 - PRODUCTS

WOOD PRODUCTS, GENERAL

Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

- Factory mark each piece of lumber with grade stamp of grading agency.
- For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
- Dress lumber, S4S, unless otherwise indicated.

Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

WOOD-PRESERVATIVE-TREATED MATERIALS

Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.

- Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

Application: Treat items indicated on Drawings, and the following:

- Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
- Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
- Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
Wood floor plates that are installed over concrete slabs-on-grade.

MISCELLANEOUS LUMBER

General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

Blocking.
Nailers.
Rooftop equipment bases and support curbs.
Cants.
Furring.
Grounds.
Utility shelving.

Dimension Lumber Items: Standard, Stud, or No. 3 grade lumber of any species.

Concealed Boards: 19 percent maximum moisture content of any of the following species and grades:

Mixed southern pine or southern pine, No. 3 grade; SPIB.
Eastern softwoods, No. 3 Common grade; NELMA.
Northern species, No. 3 Common grade; NLGA.
Western woods, Standard or No. 3 Common grade; WCLIB or WWPA.

PLYWOOD BACKING PANELS

Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

FASTENERS

General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

Screws for Fastening to Metal Framing: ASTM C1002, length as recommended by screw manufacturer for material being fastened.

Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

MISCELLANEOUS MATERIALS

Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

INSTALLATION

Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

Do not splice structural members between supports unless otherwise indicated.

Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
ICC-ES evaluation report for fastener.

PROTECTION

Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

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SECTION 07 11 13
BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

SUMMARY
Section Includes: Cold-applied, emulsified-asphalt dampproofing.

ACTION SUBMITTALS
Product Data: For each type of product.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
VOC Content: Products are to comply with VOC content limits of authorities having jurisdiction unless otherwise indicated.

COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING
Trowel Coats: ASTM D1227, Type II, Class 1.
Brush and Spray Coats: ASTM D1227, Type III, Class 1.

AUXILIARY MATERIALS
Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

Emulsified-Asphalt Primer: ASTM D1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

Extruded-polystyrene board insulation, unfaced, ASTM C578, Type X, 1/2 inch thick.

PART 3 - EXECUTION

APPLICATION, GENERAL
Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless otherwise indicated.

Apply dampproofing to provide continuous plane of protection.
Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.

Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where indicated as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING
Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat or one trowel coat at not less than 4 gal./100 sq. ft..

PROTECTION COURSE INSTALLATION

Install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 - GENERAL

SUMMARY
Section Includes: Extruded polystyrene foam-plastic board insulation.

ACTION SUBMITTALS
Product Data: For the following:
Extruded polystyrene foam-plastic board insulation.

INFORMATIONAL SUBMITTALS
Product information: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

Product test reports.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.

Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

Thermal-Resistance Value (R-Value): R-value as indicated on Drawings in accordance with ASTM C518.

EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION
Extruded Polystyrene Board Insulation, Type X: ASTM C578, Type X, 15-psi minimum compressive strength; unfaced.

POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION
Polyisocyanurate Board Insulation, Foil Faced: ASTM C1289, foil faced, Type I, Class 1 or 2.

ACCESSORIES
Insulation for Miscellaneous Voids:

Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.

Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

INSTALLATION, GENERAL

Comply with insulation manufacturer's written instructions applicable to products and applications.

Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

Install insulation with manufacturer's R-value label exposed after insulation is installed.

Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

INSTALLATION OF FOUNDATION WALL INSULATION

Butt panels together for tight fit.

Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors.

Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing according to manufacturer's written instructions.

INSTALLATION OF CAVITY-WALL INSULATION

Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer.

- Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions, and with faces flush.
- Press units firmly against inside substrates.
- Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 04 20 00 "Unit Masonry."

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 - GENERAL

SUMMARY
Section Includes:
- Building paper.
- Building wrap.
- Drainage wrap.
- Flexible flashing.
- Drainage material.

ACTION SUBMITTALS
Product data.

INFORMATIONAL SUBMITTALS
Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

PART 2 - PRODUCTS

WATER-RESISTIVE BARRIER
Building Paper: ASTM D226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.

Building Paper: Water-vapor-permeable, asphalt-saturated kraft building paper that complies with ICC-ES AC38, Grade D.

Building Wrap: ASTM E2556/E2556M, Type II air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.

- Water-Vapor Permeance: Minimum 20 perms per ASTM E96/E96M, Desiccant Method (Procedure A).
- Flame Propagation Test: Materials and construction to be as tested in accordance with NFPA 285.

Drainage Wrap: ASTM E2556/E2556M, Type II dimensional water-resistive barrier that also creates a drainage plane; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; and acceptable to authorities having jurisdiction.

- Water-Vapor Permeance: Minimum 35 perms per ASTM E96/E96M, Desiccant Method (Procedure A).

- Air Permeance: Maximum 0.004 cfm/sq. ft. at 0.3-inch wg when tested in accordance with ASTM E2178.

- Drainage: Not less than 90 percent when tested in accordance with ASTM E2273.
- Allowable UV Exposure Time: Not more than 180 days.

Acrylic Seam Tape: Composite tape consisting of a pressure-sensitive acrylic adhesive, bonded to a polyethylene or polypropylene film for sealing joints and penetrations in building wrap.

- Width: 2 inches minimum.

FLEXIBLE FLASHING

Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

Flame Propagation Test: Materials and construction to be as tested in accordance with NFPA 285.

Rubberized-Asphalt Flashing: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

Flame Propagation Test: Materials and construction to be as tested in accordance with NFPA 285.

DRAINAGE MATERIAL

Drainage Accessories: Furring strips to maintain a continuous open space between water-resistive barrier and exterior cladding to create a continuous open space behind exterior cladding.

PART 3 - EXECUTION

WATER-RESISTIVE BARRIER INSTALLATION

Cover sheathing with water-resistive barrier as follows:

Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.

Building Paper: Apply horizontally with a 2-inch overlap and a 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails.

Building Wrap or Drainage Wrap: Comply with manufacturer's written instructions and warranty requirements.

Seal seams, edges, fasteners, and penetrations with tape.
Extend into jambs of openings and seal corners with tape.

FLEXIBLE FLASHING INSTALLATION

Apply flexible flashing where indicated to comply with manufacturer's written instructions.

Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
Lap flashing over water-resistive barrier at bottom and sides of openings.
Lap water-resistive barrier over flashing at heads of openings.

DRAINAGE MATERIAL INSTALLATION

Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

END OF SECTION

SECTION 07 26 00
VAPOR RETARDERS

PART 1 - GENERAL

SUMMARY
Section Includes: Polyethylene vapor retarders.

Related Requirements:
Section 03 30 00 "Cast-in-Place Concrete" for under-slab vapor retarders.
Section 07 21 00 "Thermal Insulation" for vapor retarders integral with insulation products.

ACTION SUBMITTALS
Product Data: For each type of product.

INFORMATIONAL SUBMITTALS
Product test reports.

PART 2 - PRODUCTS

POLYETHYLENE VAPOR RETARDERS
Polyethylene Vapor Retarders: ASTM D4397, 10-mil- thick sheet, with maximum permeance rating of 0.1 perm.

PART 3 - EXECUTION

INSTALLATION OF VAPOR RETARDERS ON FRAMING
Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.

Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

INSTALLATION OF VAPOR RETARDERS UNDER SLAB
Install vapor retarders over prepared grade. Lap joints a minimum of 12 inches and seal with manufacturer's recommended tape. Install second layer over pathways to equipment.

Seal around penetrations such as utilities and columns in order to create a monolithic, airtight membrane at grade surface, perimeter, and all vertical penetrations.

END OF SECTION

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SECTION 07 53 23
ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 – GENERAL

SUMMARY

Section Includes:

- Adhered or Mechanically fastened ethylene-propylene-diene-terpolymer (EPDM) roofing system.
- Accessory roofing materials.
- Substrate board.
- Roof insulation.
- Insulation accessories and cover board.
- Asphalt materials.
- Walkways.

PREINSTALLATION MEETINGS

Preliminary Conference: Conduct conference at Project site.

ACTION SUBMITTALS

Product Data: For each type of product.

Shop Drawings: Include roof plans, sections, details, and attachments to other work.

Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

INFORMATIONAL SUBMITTALS

Product Test Reports: For components of roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

Field quality-control reports.

Sample warranties.

CLOSEOUT SUBMITTALS

Maintenance data.

Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

WARRANTY

Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

Warranty Period: 15 years from Date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

Accelerated Weathering: Roof membrane to withstand 2000 hours of exposure when tested in accordance with ASTM G152, ASTM G154, or ASTM G155.

Impact Resistance: Roof membrane to resist impact damage when tested in accordance with ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

Wind Uplift Resistance: Design roofing system to resist wind uplift pressure for Zone 1.

Energy Star Listing: Roofing system to be listed on the DOE's Energy Star "Roof Products Qualified Product List" for low-slope roof products.

Energy Performance: Roofing system to have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested in accordance with ANSI/CRRC S100.

Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class C; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

ETHYLENE-PROPYLENE-DIENE-TERPOLYMER (EPDM) ROOFING

EPDM Sheet: ASTM D4637/D4637M, Type I, nonreinforced, EPDM sheet.

Thickness: minimum of 60 mils, nominal.
Exposed Face Color: Match existing roof color, assumed to be Black.

ACCESSORY ROOFING MATERIALS

General: Accessory materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, according to application.

Protection Sheet: Epichlorohydrin or neoprene nonreinforced flexible sheet, 55 to 60 mils thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.

Slip Sheet: Manufacturer's standard, of thickness required for application.

Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

Bonding Adhesive: Manufacturer's standard.

Low-Rise, Urethane, Fabric-Backed Membrane Adhesive: Roof system manufacturer's standard spray-applied, low-rise, two-component urethane adhesive formulated for compatibility and use with fabric-backed membrane roofing.

Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch-wide minimum, butyl splice tape with release film.

Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer.

Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

Provide white flashing accessories for white EPDM membrane roofing.

SUBSTRATE BOARD

Gypsum Board, Type X: ASTM C1396/C1396M.

Thickness: 5/8 inch.

Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

ROOF INSULATION

Extruded-Polystyrene Board Insulation: ASTM C578, Type IV, 1.45-lb/cu. ft. minimum density, 25 psi minimum compressive strength square edged.

Tapered Insulation: Provide factory-tapered insulation boards.

Material: Match roof insulation.

Minimum Thickness: 1/4 inch.

Slope:

Roof Field: 1/4 inch per foot unless otherwise indicated on Drawings.

Saddles and Crickets: 1/2 inch per foot unless otherwise indicated on Drawings.

INSULATION ACCESSORIES AND COVER BOARD

Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer.

Oriented Strand Board: DOC PS 2, Exposure 1, 7/16 inch thick.

ASPHALT MATERIALS

Roofing Asphalt: ASTM D312/D312M, Type III or Type IV.

Asphalt Primer: ASTM D41/D41M.

WALKWAYS

Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately 3/16 inch thick and acceptable to roofing system manufacturer.

Size: Approximately 36 by 60 inches.

Color: Contrasting with roof membrane.

PART 3 - EXECUTION

EXAMINATION

Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

PREPARATION

Perform fastener-pullout tests in accordance with roof system manufacturer's written instructions.

Submit test result within 24 hours of performing tests.

Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

Install sound-absorbing insulation strips in accordance with acoustical roof deck manufacturer's written instructions.

INSTALLATION OF ROOFING, GENERAL

Install roofing system in accordance with roofing system manufacturer's written instructions, assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weather-tightness of transition and to not void warranty for existing roofing system.

Coordinate installation and transition of roofing system component serving as an air barrier.

INSTALLATION OF SUBSTRATE BOARD

Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.

At steel roof decks, install substrate board at right angle to flutes of deck. Locate end joints over crests of steel roof deck.

Tightly butt substrate boards together.

Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

Fasten substrate board to top flanges of steel deck in accordance with recommendations in and FM Global Property Loss Prevention Data Sheet 1-29.

Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof in accordance with roofing system manufacturers' written instructions.

Loosely lay substrate board over roof deck.

INSTALLATION OF INSULATION

Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

Installation Over Metal Decking:

Install base layer of insulation with joints staggered not less than 24 inches in adjacent rows.

Locate end joints over crests of decking.

Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

Make joints between adjacent insulation boards not more than 1/4 inch in width.

At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

Trim insulation so that water flow is unrestricted.

Fill gaps exceeding 1/4 inch with insulation.
Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
Loosely lay base layer of insulation units over substrate.
Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.

Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.

Staggered end joints within each layer not less than 24 inches in adjacent rows.
Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.
Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
Make joints between adjacent insulation boards not more than 1/4 inch in width.
At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
Trim insulation so that water flow is unrestricted.
Fill gaps exceeding 1/4 inch with insulation.
Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
Loosely lay each layer of insulation units over substrate.
Adhere each layer of insulation to substrate using adhesive in accordance with FM Global Property Loss Prevention Data Sheet 1-29, as follows:

Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

INSTALLATION OF COVER BOARDS

Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.

Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
At internal roof drains, conform to slope of drain sump.
Trim cover board so that water flow is unrestricted.

Cut and fit cover board tight to nailers, projections, and penetrations.
Loosely lay cover board over substrate.
Adhere cover board to substrate using adhesive in accordance with FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:

Set cover board in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

Install slip sheet over cover board and immediately beneath roofing.

ADHERED ROOFING INSTALLATION

Adhere roof membrane over area to receive roofing in accordance with roofing system manufacturer's written instructions.

Unroll membrane roof membrane and allow to relax before installing.

Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeters.

Apply roof membrane with side laps shingled with slope of roof deck where possible.

Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.

Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
Apply lap sealant and seal exposed edges of roofing terminations.

Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

Adhere protection sheet over roof membrane at locations indicated.

MECHANICALLY FASTENED MEMBRANE ROOFING INSTALLATION

Mechanically fasten roof membrane over area to receive roofing in accordance with roofing system manufacturer's written instructions.

Unroll roofing membrane and allow to relax before installing.

For in-splice attachment, install roof membrane with long dimension perpendicular to steel roof deck flutes.

Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

Mechanically fasten or adhere roof membrane securely at terminations, penetrations, and perimeter of roofing.

Apply roof membrane with side laps shingled with slope of roof deck where possible.

Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement.

Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
Apply lap sealant and seal exposed edges of roofing terminations.
Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.

Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.

Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
Apply lap sealant and seal exposed edges of roofing terminations.

Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

In-Splice Attachment: Secure one edge of roof membrane using fastening plates or metal battens centered within splice, and mechanically fasten roof membrane to roof deck. Field splice seam.

Through-Membrane Attachment: Secure roofing using fastening plates or metal battens, and mechanically fasten roof membrane to roof deck. Cover battens and fasteners with a continuous cover strip.

Adhere protection sheet over roof membrane at locations indicated.

INSTALLATION OF BASE FLASHING

Install sheet flashings and preformed flashing accessories, and adhere to substrates in accordance with roofing system manufacturer's written instructions.

Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

INSTALLATION OF WALKWAYS

Flexible Walkways: Install walkway products in accordance with manufacturer's written instructions.

Install flexible walkways at the following locations:

Perimeter of each rooftop unit.
Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
As required by roof membrane manufacturer's warranty requirements.

Provide 6-inch clearance between adjoining pads.
Adhere walkway products to substrate with compatible adhesive in accordance with roofing system manufacturer's written instructions.

PROTECTING AND CLEANING

Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and in accordance with warranty requirements.

Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

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SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

SUMMARY
Section Includes:
- Manufactured reglets with counterflashing.
- Formed roof-drainage sheet metal fabrications.
- Formed low-slope roof sheet metal fabrications.
- Formed steep-slope roof sheet metal fabrications.
- Formed wall sheet metal fabrications.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each of the following
- Underlayment materials.
- Elastomeric sealant.
- Butyl sealant.
- Epoxy seam sealer.

INFORMATIONAL SUBMITTALS
Sample warranty.

CLOSEOUT SUBMITTALS
Maintenance data.
Special warranty.

QUALITY ASSURANCE
Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

WARRANTY
Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
- Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
- Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
- Cracking, checking, peeling, or failure of paint to adhere to bare metal.

Finish Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim are not to rattle, leak, or loosen, and are to remain watertight.

Sheet Metal Standard for Flashing and Trim: Comply with requirements for dimensions and profiles shown unless more stringent requirements are indicated.

Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

SHEET METALS

Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

Stainless Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed; with smooth, flat surface.

Finish: ASTM A480/A480M, No. 2D (dull, cold rolled).

Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation; prepainted by coil-coating process to comply with ASTM A755/A755M.

Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.
Exposed Coil-Coated Finish:

Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.

Color: As selected by Architect from manufacturer's full range.
Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

UNDERLAYMENT MATERIALS

Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.

Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F or lower.

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

MISCELLANEOUS MATERIALS

Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.

Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M.

Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

Bituminous Coating: Cold-applied asphalt emulsion in accordance with ASTM D1187/D1187M.

Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

Material: Galvanized steel, 0.022 inch thick.

Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.

Accessories:

Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.

Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.

Finish: Mill.

FABRICATION, GENERAL

Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.

Fabricate sheet metal flashing and trim in shop to greatest extent possible.

Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.

Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

Fabrication Tolerances:

Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.

Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

Use lapped expansion joints only where indicated on Drawings.

Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.

Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

Seams:

Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

ROOF-DRAINAGE SHEET METAL FABRICATIONS

Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch-wide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fabricate from the following materials:

Galvanized Steel: 0.028 inch thick.

LOW-SLOPE ROOF SHEET METAL FABRICATIONS

Roof Edge Flashing (Gravel Stop) and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long sections. Furnish with 6-inch-wide, joint cover plates.

Galvanized Steel: 0.028 inch thick.

Copings: Fabricate in minimum 96-inch-long, but not exceeding 12-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and interior leg. Miter corners, fasten and seal watertight.

Galvanized Steel: 0.040 inch thick.

Base Flashing: Fabricate from the following materials:

Galvanized Steel: 0.028 inch thick.

Counterflashing: Fabricate from the following materials:

Galvanized Steel: 0.022 inch thick.

Roof-Penetration Flashing: Fabricate from the following materials:

Galvanized Steel: 0.028 inch thick.

Roof-Drain Flashing: Fabricate from the following materials:

Stainless Steel: 0.0156 inch thick.

STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:

Galvanized Steel: 0.022 inch thick.

Drip Edges: Fabricate from the following materials:
Galvanized Steel: 0.022 inch thick.

WALL SHEET METAL FABRICATIONS

Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch-high, end dams.
Stainless Steel: 0.0156 inch thick.

Wall Expansion-Joint Cover: Fabricate from the following materials:
Galvanized Steel: 0.028 inch thick.

PART 3 - EXECUTION

INSTALLATION OF UNDERLAYMENT

Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim.

Install in shingle fashion to shed water.
Lap joints not less than 2 inches.

Synthetic Underlayment: Install synthetic underlayment, wrinkle free, in accordance with manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

Lap horizontal joints not less than 4 inches.
Lap end joints not less than 12 inches.

Self-Adhering, High-Temperature Sheet Underlayment:

Install self-adhering, high-temperature sheet underlayment; wrinkle free.
Prime substrate if recommended by underlayment manufacturer.
Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.
Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses.
Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller.
Roll laps and edges with roller.
Cover underlayment within 14 days.

Install slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.
Install in shingle fashion to shed water.
Lapp joints not less than 4 inches.

INSTALLATION, GENERAL

Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

Install fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of sealant.
Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
Install sheet metal flashing and trim to fit substrates and to result in watertight performance.

Install continuous cleats with fasteners spaced not more than 12 inches o.c.
Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
Do not field cut sheet metal flashing and trim by torch.

Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

Coat concealed side of stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
Use lapped expansion joints only where indicated on Drawings.

Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

Seal joints as required for watertight construction.

Use sealant-filled joints unless otherwise indicated.

Embed hooked flanges of joint members not less than 1 inch into sealant.
Form joints to completely conceal sealant.
When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
Adjust setting proportionately for installation at higher ambient temperatures.

Do not install sealant-type joints at temperatures below 40 deg F.

Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

Rivets: Rivet joints in uncoated aluminum where necessary for strength.

INSTALLATION OF ROOF-DRAINAGE SYSTEM

Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

Parapet Scuppers:
Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.

Loosely lock front edge of scupper with conductor head.
seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.

Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated on Drawings. Lap joints minimum of 4 inches in direction of water flow.

INSTALLATION OF ROOF FLASHINGS

Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.

Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
Install work with laps, joints, and seams that are permanently watertight and weather resistant.

Roof Edge Flashing:
Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.
Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

Copings:
Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.

Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.

Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
Insert counterflashing in reglets or receivers and fit tightly to base flashing.
Extend counterflashing 4 inches over base flashing.
Lap counterflashing joints minimum of 4 inches.

Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl sealant and clamp flashing to pipes that penetrate roof.

INSTALLATION OF WALL FLASHINGS

Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

Reglets: Installation of reglets is specified in Section 04 20 00 "Unit Masonry."

INSTALLATION TOLERANCES

Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

CLEANING

Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

Clean and neutralize flux materials. Clean off excess solder.

Clean off excess sealants.

PROTECTION

Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION

SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

SUMMARY

Section Includes:

- Silicone joint sealants.
- Nonstaining silicone joint sealants.
- Urethane joint sealants.
- Immersible joint sealants.
- Mildew-resistant joint sealants.
- Latex joint sealants.

PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS

Product data.

Samples: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

Joint-sealant schedule.

INFORMATIONAL SUBMITTALS

Field Quality-Control Reports: For field-adhesion-test reports, for each sealant application tested.

Sample warranties.

CLOSEOUT SUBMITTALS

Warranty Documentation:

- Manufacturers' special warranties.
- Installer's special warranties.

WARRANTY

Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

Warranty Period: Two years from date of Substantial Completion.

Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

Warranty Period: Five years from date of Substantial Completion.

Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

- Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
- Disintegration of joint substrates from causes exceeding design specifications.
- Mechanical damage caused by individuals, tools, or other outside agents.
- Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

JOINT SEALANTS, GENERAL

Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

SILICONE JOINT SEALANTS

Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Uses T and NT.

NONSTAINING SILICONE JOINT SEALANTS

Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.

Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.

URETHANE JOINT SEALANTS

Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.

IMMERSIBLE JOINT SEALANTS

Immersible Joint Sealants. Suitable for immersion in liquids; ASTM C1247; tested in deionized water unless otherwise indicated

Urethane, Immersible, S, NS, 50, T, NT, I: Immersible, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 50, Uses T, NT, and I.

MILDEW-RESISTANT JOINT SEALANTS

Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

LATEX JOINT SEALANTS

Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

JOINT-SEALANT BACKING

Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

MISCELLANEOUS MATERIALS

Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

PREPARATION

Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- Concrete.
- Masonry.
- Unglazed surfaces of ceramic tile.
- Exterior insulation and finish systems.

Remove laitance and form-release agents from concrete.

Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

- Metal.
- Glass.
- Porcelain enamel.
- Glazed surfaces of ceramic tile.

Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

INSTALLATION OF JOINT SEALANTS

General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

Do not leave gaps between ends of sealant backings.
Do not stretch, twist, puncture, or tear sealant backings.
Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

Install sealants using proven techniques that comply with the following and at the same time backings are installed:

Place sealants so they directly contact and fully wet joint substrates.
Completely fill recesses in each joint configuration.
Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

Remove excess sealant from surfaces adjacent to joints.
Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.
Provide flush joint profile in accordance with Figure 8B in ASTM C1193.
Provide recessed joint configuration of recess depth in accordance with Figure 8C in ASTM C1193.
Use masking tape to protect surfaces adjacent to recessed tooled joints.

Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 08 13 16
ALUMINUM DOORS AND FRAMES

PART 1 - GENERAL

SUMMARY
Section Includes: Aluminum doors and Frames for exterior locations.

ACTION SUBMITTALS
Product data.
Shop drawings.
Samples: Manufacturer's standard color sheets, showing full range of available colors for each type of exposed finish.

INFORMATIONAL SUBMITTALS
Qualification data.
Product test reports.
Sample warranty.

CLOSEOUT SUBMITTALS
Maintenance data.

QUALITY ASSURANCE
Manufacturer Qualifications: A manufacturer capable of fabricating aluminum doors that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.

WARRANTY
Special Warranty: Manufacturer agrees to repair or replace components of aluminum doors that fail in materials or workmanship within specified warranty period.

Warranty Period:
Aluminum Door: Five years from date of Substantial Completion.
Insulating-Glass Units: 10 years from date of Substantial Completion.
Laminated Glass: Five years from date of Substantial Completion.
Aluminum Finish: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

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

Arcadia, Inc.
Wausau Window and Wall Systems; Apogee Wausau Group, Inc.
Winco Window Company, Inc.

PERFORMANCE REQUIREMENTS
Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

Performance Class: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
Minimum Performance Class: Class LC.

Thermal Transmittance: NFRC 100 maximum total fenestration product U-factor of 0.35 Btu/sq. ft. x h x deg F.

Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum total fenestration product SHGC of 0.30.

ALUMINUM DOORS AND FRAMES

Frames and Door Panels: Fabricated from aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

Thermally Improved Construction: Fabricate frames and door panels with an integral, concealed, low-conductance thermal barrier located between exterior and interior surfaces in a manner that eliminates direct metal-to-metal contact.

Threshold: Provide extruded-aluminum threshold of thickness, dimensions, and profile indicated; designed to comply with performance requirements indicated and to drain to the exterior; with manufacturer's standard finish.

Low-Profile Threshold: ADA-ABA compliant.

GLAZING

Glass and Glazing: Manufacturer's standard glazing system that produces weathertight seal. Comply with requirements indicated in Section 08 80 00 "Glazing."

Glass: ASTM C1036, Type 1, q3, Category II safety glass complying with testing requirements in 16 CFR 1201.

Safety Glazing Labeling: Permanently mark safety glazing with certification label of the manufacturer. Label will indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

Insulating-Glass Units: ASTM E2190.

Filling: Fill space between glass lites with air, argon, or a mixture of air and argon.

Low-E coating.

HARDWARE

Refer to section 08 71 00 Door Hadware.

ACCESSORIES

Anchors, Clips, and Accessories: Provide anchors, clips, and accessories of aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron for aluminum doors, complying with ASTM B456 or ASTM B633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

FABRICATION

Fabricate aluminum doors in sizes indicated. Include a complete system for assembling components and anchoring doors.

Weather Stripping: Provide full-perimeter weather stripping for each door panel.

Weep Holes: Provide weep holes and internal drainage passages to conduct infiltrating water to exterior.

Factory-Glazed Fabrication: Glaze aluminum doors in the factory. Comply with requirements in Section 08 80 00 "Glazing" and with AAMA/WDMA/CSA 101/I.S.2/A440.

ALUMINUM FINISHES

Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

Color: As selected by Architect from full range of industry colors and color densities.

INSTALLATION

Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing doors, frames, hardware, accessories, and other components.

Install aluminum doors level, plumb, square, true to line; without distortion, warp, or rack of frames and panels and without impeding thermal movement; anchored securely in place to structural support; and in proper relation to wall flashing, vapor retarders, air barriers, water/weather barriers, and other adjacent construction.

Set sill members in bed of sealant to provide weathertight construction.

Install aluminum doors and components to drain condensation, water-penetrating joints, and moisture migrating within doors to the exterior.

Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

Adjust operating panels to provide a tight fit at contact points and weather stripping for smooth operation, without binding, and a weathertight closure. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.

END OF SECTION

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SECTION 08 51 13
ALUMINUM WINDOWS

PART 1 - GENERAL

SUMMARY
Section includes aluminum windows for exterior locations.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each type of product.

Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
Samples: For each exposed product and for each color specified.

INFORMATIONAL SUBMITTALS
Product test reports.
Sample warranties.

WARRANTY
Manufacturer's Warranty: Manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period.

Warranty Period:
Window: 10 years from date of Substantial Completion.
Glazing Units: 10 years from date of Substantial Completion.
Aluminum Finish: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

WINDOW PERFORMANCE REQUIREMENTS
Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

Window Certification: AAMA certified with label attached to each window.

Performance Class: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
Minimum Performance Class: LC.

Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F.

Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.

Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

ALUMINUM WINDOWS

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

- Arcadia, Inc.
- Manko Window Systems, Inc.
- Wausau Window and Wall Systems; Apogee Wausau Group, Inc.
- Winco Window Company, Inc.

Types: As indicated on Drawings.

Frames and Sashes: Aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.

- Thermally Improved Construction: Fabricate frames, sashes, and muntins with an integral, concealed, low-conductance thermal barrier located between exterior materials and window members exposed on interior side in a manner that eliminates direct metal-to-metal contact.

Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.

- Kind: Fully tempered.

Insulating-Glass Units: ASTM E2190.

- Glass: ASTM C1036, Type 1, Class 1, q3.
  - Tint: Gray.
  - Kind: Fully tempered.
- Lites: Two.
- Filling: Fill space between glass lites with air or air/argon mix.
- Low-E Coating: Sputtered on second surface.

Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

Hardware, General: Provide manufacturer's standard corrosion-resistant hardware sized to accommodate sash weight and dimensions.

- Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range, match windows on existing building.

Casement or Projected Window Hardware:

- Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.
  - Type and Style: As selected by Architect from manufacturer's full range of types and styles.
- Hinges: Non-friction type, not less than two per sash.
- Lock: Manufacturer's standard.
- Limit Devices: Limit clear opening to 4 inches for ventilation; with custodial key release.

Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

ACCESSORIES

Subsills: Thermally broken, extruded-aluminum subsills in configurations indicated on Drawings.

Column Covers: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

Interior Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

Panning Trim: Extruded-aluminum profiles in sizes and configurations indicated on Drawings.

Receptor System: Two-piece, snap-together, thermally broken, extruded-aluminum receptor system that anchors windows in place.

INSECT SCREENS

General: Fabricate insect screens to integrate with window frame. Provide screen for each operable exterior sash. Screen wickets are not permitted.

Type and Location: Full, inside for outswing; Full, inside for projected, awning; Full, outside for inswing sashes.

Aluminum Frames: Complying with SMA 1004 or SMA 1201.

Glass-Fiber Mesh Fabric: 18-by-14 or 18-by-16 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration. Comply with ASTM D3656/D3656M.

Mesh Color: Manufacturer's standard.

FABRICATION

Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

Glaze aluminum windows in the factory.

Weather strip each operable sash to provide weathertight installation.

Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

Provide water-shed members above side-hinged sashes and similar lines of natural water penetration.

Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.

Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation.

ALUMINUM FINISHES

Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.

Color: As selected by Architect from full range of industry colors and color densities, match existing building.

PART 3 - EXECUTION

INSTALLATION

Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

SUMMARY
Section Includes: Mechanical door hardware for swinging doors.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product data.

Shop Drawings: For electrified door hardware.
Diagrams for power, signal, and control wiring.
Details of interface of electrified door hardware and building safety and security systems.

INFORMATIONAL SUBMITTALS
Sample warranty.

CLOSEOUT SUBMITTALS
Maintenance data.

WARRANTY
Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
Exit Devices: Two years from date of Substantial Completion.
Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

SOURCE LIMITATIONS
Obtain each type of door hardware from single manufacturer.
Provide electrified door hardware from same manufacturer as mechanical door hardware unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.

PERFORMANCE REQUIREMENTS
Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

Accessibility Requirements: For door hardware on doors in an accessible route, comply with the ABA standards of the Federal agency having jurisdiction and ICC A117.1.

HINGES
Hinges: ANSI/BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

CONTINUOUS HINGES

Continuous, Pin-and-Barrel-Type Hinges: ANSI/BHMA A156.26; minimum 0.120-inch-thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

MECHANICAL LOCKS AND LATCHES

Lock Functions: As indicated in door hardware schedule.

Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

Bored Locks: Minimum 1/2-inch latchbolt throw.

Deadbolts: Minimum 1-inch bolt throw.

Lock Backset: 2-3/4 inches unless otherwise indicated.

Lock Trim:

Levers: Cast.

Dummy Trim: Match lever lock trim and escutcheons.

Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

Bored Locks: ANSI/BHMA A156.2, Grade 2, Series 4000.

AUXILIARY LOCKS

Bored Auxiliary Locks: ANSI/BHMA A156.36, Grade 2; with strike that suits frame.

ELECTRIC STRIKES

Electric Strikes: ANSI/BHMA A156.31, Grade 2; with faceplate to suit lock and frame.

ELECTROMAGNETIC LOCKS

Electromagnetic Locks: ANSI/BHMA A156.23; electrically powered; with electromagnet attached to frame and armature plate attached to door; full-exterior or full-interior type, as required by application indicated.

ELECTROMECHANICAL LOCKS

Electromechanical Locks: ANSI/BHMA A156.25, Grade 2; motor or solenoid driven; with strike that suits frame.

Type: Bored.

SELF-CONTAINED ELECTRONIC LOCKS

Self-Contained Electronic Locks: ANSI/BHMA A156.25, bored; with internal, battery-powered, self-contained electronic locks; consisting of complete lockset, motor-driven lock mechanism, and actuating device; enclosed in zinc-dichromate-plated, wrought-steel case, and strike that suits frame. Provide key override, low-battery detection and warning, LED status indicators, and ability to program at the lock.

SURFACE BOLTS

Surface Bolts: ANSI/BHMA A156.16.

MANUAL FLUSH BOLTS

Manual Flush Bolts: ANSI/BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

Automatic Flush Bolts: ANSI/BHMA A156.3, Type 25; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge. Include wear plates.

Self-Latching Flush Bolts: ANSI/BHMA A156.3, Type 27; minimum 3/4-inch throw; with dust-proof strikes; designed for mortising into door edge. Include wear plates.

EXIT DEVICES AND AUXILIARY ITEMS

Exit Devices and Auxiliary Items: ANSI/BHMA A156.3.

LOCK CYLINDERS

Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.

Standard Lock Cylinders: ANSI/BHMA A156.5, Grade 2 permanent cores; face finished to match lockset.
Core Type: Interchangeable.

Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

KEYING

Keying System: Factory registered, complying with guidelines in ANSI/BHMA A156.28, appendix. Provide one extra key blank for each lock.

Existing System:
Master key or grand master key locks to Owner's existing system.

Keys: Nickel silver.
Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
Notation: Information to be furnished by Owner.

OPERATING TRIM

Operating Trim: ANSI/BHMA A156.6; aluminum unless otherwise indicated.

ACCESSORIES FOR PAIRS OF DOORS

Coordinators: ANSI/BHMA A156.3; consisting of active-leaf, hold-open lever, and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.

Astragals: ANSI/BHMA A156.22.

SURFACE CLOSERS

Surface Closers: ANSI/BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

DOOR GASKETING

Door Gasketing: ANSI/BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

Maximum Air Leakage: When tested in accordance with ASTM E283/E283M with tested pressure differential of 0.3 inch wg, as follows:

Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.

Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.

Gasketing on Double Doors: 0.50 cfm per ft. of door opening.

THRESHOLDS

Thresholds: ANSI/BHMA A156.21; fabricated to full width of opening indicated.

METAL PROTECTIVE TRIM UNITS

Metal Protective Trim Units: ANSI/BHMA A156.6; fabricated from 0.050-inch-thick aluminum; with manufacturer's standard machine or self-tapping screw fasteners.

AUXILIARY DOOR HARDWARE

Auxiliary Door Hardware: ANSI/BHMA A156.16.

AUXILIARY ELECTRIFIED DOOR HARDWARE

Auxiliary Electrified Door Hardware: ANSI/BHMA A156.35.

FINISHES

Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule.

PART 3 - EXECUTION

INSTALLATION

Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

Standard Steel Doors and Frames: ANSI/SDI A250.8.

Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

Lock Cylinders: Install construction cores to secure building and areas during construction period.

Replace construction cores with permanent cores as directed by Owner.

Furnish permanent cores to Owner for installation.

Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.

Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.

Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."

Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

Do not notch perimeter gasketing to install other surface-applied hardware.

Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

ADJUSTING

Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

DOOR HARDWARE SCHEDULE

Hardware Set 1: New double door

- 3 Hinges per leaf
- Entry Function Locket
- Panic Exit Hardware
- Weather-stripping at Jambs and Head of door
- 1 Door closer per leaf
- Threshold
- Sweep

END OF SECTION

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SECTION 08 80 00
GLAZING

PART 1 - GENERAL

SUMMARY

Section Includes:

- Glass products.
- Insulating glass.
- Glazing sealants.
- Glazing tapes.
- Miscellaneous glazing materials.

COORDINATION

Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

PREINSTALLATION MEETINGS

Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS

Product Data: For each type of product.

INFORMATIONAL SUBMITTALS

Product Certificates: For glass.

Product test reports.

Preconstruction adhesion and compatibility test report.

Sample warranties.

WARRANTY

Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

Warranty Period: 10 years from date of Substantial Completion.

Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.

Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS

Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:

Design Wind Pressures: As indicated on Drawings.

Design Snow Loads: As indicated on Drawings.

Thermal Loads: Design glazing to resist thermal stress breakage induced by differential temperature conditions and limited air circulation within individual glass lites and insulated glazing units.

Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on most current non-beta version of LBL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F.
SHGC and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on most current non-beta version of LBL's WINDOW computer program.
Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

GLASS PRODUCTS, GENERAL

Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.

Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

GLASS PRODUCTS

Tinted Annealed Float Glass: ASTM C1036, Type I, Class 2 (tinted), Quality-Q3.

Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

Reflective- and Low-E-Coated Vision Glass: ASTM C1376.

INSULATING GLASS

Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.

Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
Perimeter Spacer: Manufacturer's standard spacer material and construction.
Desiccant: Molecular sieve or silica gel, or a blend of both.

GLAZING SEALANTS

General:

Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range of industry colors.

GLAZING TAPES

Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

AAMA 804.3 tape, where indicated.
AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.
AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

MISCELLANEOUS GLAZING MATERIALS

Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

Setting Blocks:
Type recommended in writing by sealant or glass manufacturer.

Spacers:
Type recommended in writing by sealant or glass manufacturer.

Edge Blocks:
Type recommended in writing by sealant or glass manufacturer.

Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

PART 3 - EXECUTION

GLAZING, GENERAL

Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

Provide spacers for glass lites where length plus width is larger than 50 inches.

Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

TAPE GLAZING

Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

Apply heel bead of elastomeric sealant.

Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

Apply cap bead of elastomeric sealant over exposed edge of tape.

GASKET GLAZING (DRY)

Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.

Install gaskets so they protrude past face of glazing stops.

SEALANT GLAZING (WET)

Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

Tool exposed surfaces of sealants to provide a substantial wash away from glass.

CLEANING AND PROTECTION

Immediately after installation, remove nonpermanent labels and clean surfaces.

Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

Remove and replace glass that is damaged during construction period.

INSULATING GLASS SCHEDULE

Low-E-Coated, Tinted Insulating Glass Type:

Overall Unit Thickness: 1 inch minimum.
Outdoor Lite: Tinted fully tempered float glass.
Tint Color: Gray.
Interspace Content: Air, Argon, or mix.
Indoor Lite: Clear fully tempered float glass.
Low-E Coating: Sputtered on second surface.

END OF SECTION

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SECTION 09 30 13
CERAMIC TILING

PART 1 - GENERAL

SUMMARY

Section Includes:

- Porcelain tile.
- Setting material.
- Grout materials.

ACTION SUBMITTALS

Product Data:

- Porcelain tile.
- Thresholds.
- Waterproof membranes.
- Crack isolation membranes.
- Setting material.
- Grout materials.

Shop Drawings: Show locations, plans, and elevations, of each type of tile and tile pattern. Show widths, details, and locations of movement joints in tile substrates and finished tile surfaces.

MAINTENANCE MATERIAL SUBMITTALS

Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

PRODUCTS, GENERAL

ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

PORCELAIN TILE

Porcelain Tile Type: Unglazed.

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

- any Dal-Tile Corpoation brands.
- Crossville, Inc.
- Interceramic.

Face Size: 4 by 4 inches, match existing tile.
Face Size Variation: Rectified.
Thickness: Match existing floor tile
Product Use Classification: Interior, Dry (ID).
Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range.
Grout Color: As selected by Architect from manufacturer's full range.
Precoat with temporary protective coating.

Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

Base Cap: Surface bullnose, module size same as adjoining flat tile.

Wainscot Cap: Surface bullnose, module size same as adjoining flat tile.

Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it; same size as adjoining flat tile.

External Corners: Surface bullnose, module size same as adjoining flat tile.

Internal Corners: Field-butted square corners.

THRESHOLDS

General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.

WATERPROOF MEMBRANES

General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.

Waterproof Membrane, Sheet: Polyethylene sheet faced on one or both sides with polyester fabric.

Nominal Thickness: 0.03 inch.

Waterproof Membrane, Fluid Applied: Liquid-latex rubber or elastomeric polymer.

CRACK ISOLATION MEMBRANES

General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.

SETTING MATERIALS

Standard Dry-Set Mortar (Thinset): ANSI A118.1.

GROUT MATERIALS

Standard Cement Grout: ANSI A118.6.

Grout for Pregrouted Tile Sheets: Same product used in factory to pregrout tile sheets.

MISCELLANEOUS MATERIALS

Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.

Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D4397, 4.0 mils thick.

Metal Flooring Transitions: Profile designed specifically for flooring applications; height to match tile and setting-bed thickness.

Description: L-shaped.

Material and Finish: Metallic or combination of metal and PVC or neoprene base; polished chrome anodized aluminum exposed-edge material.

Color: Gray.

Temporary Protective Coating: Formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products and easily removable after grouting is completed without damaging grout or tile.

Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

EXAMINATION

Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
- Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

Proceed with installation only after unsatisfactory conditions have been corrected.

PREPARATION

Remove coatings, including curing compounds or other coatings that are incompatible with tile-setting materials.

Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1 and is sloped 1/4 inch per foot toward drains.

Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

Substrate Flatness:

- For tile shorter than 15 inches, confirm that structure or substrate is limited to variation of 1/4 inch in 10 ft. from the required plane, and no more than 1/16 inch in 12 inches when measured from tile surface high points.
- For large format tile, tile with at least one edge 15 inches or longer, confirm that structure or substrate is limited to 1/8 inch in 10 ft. from the required plane, and no more than 1/16 inch in 24 inches when measured from tile surface high points.

Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

INSTALLATION OF CERAMIC TILE SYSTEM

Install tile backing panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

Allow crack isolation membrane to cure before installing tile or setting materials over it.

Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.

Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.

Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

Metal Flooring Transitions: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

Grout Sealer: Apply grout sealer to grout joints in tile floors in accordance with manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

END OF SECTION

SECTION 09 51 13
ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

SUMMARY
Section includes acoustical panels and exposed suspension systems for interior ceilings.

PREINSTALLATION MEETINGS
Preinstallation Conference: Conduct conference at Project site.

ACTION SUBMITTALS
Product Data: For each type of product.
Samples: For each exposed product and for each color and texture specified.

INFORMATIONAL SUBMITTALS
Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.

CLOSEOUT SUBMITTALS
Maintenance data.

PART 2 - PRODUCTS

ACOUSTICAL PANELS (ACT-1)
Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Armstrong World Industries, Inc.
Chicago Metallic Corporation.
USG Corporation.

Acoustical Panel Standard: Manufacturer's standard panels according to ASTM E 1264.
Classification: FS SS-S-118.
Color: White, fine fissured texture
Light Reflectance (LR): Class A, 0.75 or greater.
Ceiling Attenuation Class (CAC): 35-39.
Noise Reduction Coefficient (NRC): 0.55.
Edge/Joint Detail: Tegular Edge
Thickness: 5/8 inch.
Modular Size: 24 by 24 inches.

METAL SUSPENSION SYSTEM
Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

Armstrong World Industries, Inc.
Chicago Metallic Corporation.
USG Corporation.

Metal Suspension-System Standard: Manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M.

ACCESSORIES

Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

Hold-Down Clips: Manufacturer's standard hold-down.

METAL EDGE MOLDINGS AND TRIM

Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

PART 3 - EXECUTION

PREPARATION

Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated.

Layout openings for penetrations centered on the penetrating items.

INSTALLATION

Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

Do not use exposed fasteners, including pop rivets, on moldings and trim.

Arrange directionally patterned acoustical panels as follows:

As indicated on reflected ceiling plans.

Install panels with pattern running in one direction parallel to long axis of space.

Install panels in a basket-weave pattern.

Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

END OF SECTION

SECTION 09 91 23
INTERIOR PAINTING
PART 1 - GENERAL

SUMMARY
Section Includes:
- Primers.
- Water-based finish coatings.

ACTION SUBMITTALS
Product Data: For each type of product.
Samples: For each type of topcoat product.

PART 2 - PRODUCTS

MANUFACTURERS
Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
- Behr Paint Company; Behr Process Corporation.
- Benjamin Moore & Co.
- Diamond-Vogel Paints
- ICI Paints
- Mautz Paints
- PPG (Industries, Inc. (Pittsburgh Paints)
- Sherwin-Williams Company (The).

PAINT PRODUCTS, GENERAL
Material Compatibility:
- Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

Colors: As selected by Architect from manufacturer's full range.

PRIMERS
Interior/Exterior Latex Block Filler: Water-based, high-solids, emulsion coating formulated to bridge and fill porous surfaces of exterior concrete masonry units in preparation for specified subsequent coatings.

Alkali-Resistant, Water-Based Primer: Water-based primer formulated for use on alkaline surfaces, such as plaster, vertical concrete, and masonry.

Interior Latex Primer Sealer: Water-based latex sealer used on new interior plaster, concrete, and gypsum wallboard surfaces.

Interior Latex Primer for Wood: Waterborne-emulsion primer formulated for resistance to extractive bleeding, mold, and microbials; for hiding stains; and for use on interior wood subject to extractive bleeding.

Quick-Drying Aluminum Primer: Corrosion-resistant, solvent-based, alkyd or modified-alkyd primer formulated for quick-drying capabilities and for use on prepared exterior aluminum.

WATER-BASED FINISH COATS
Interior, Latex, Eggshell: Pigmented, water-based paint for use on primed/sealed interior plaster and gypsum board, and on primed wood and metals.

Gloss and Sheen Level: Manufacturer's standard low-sheen finish.

DRY FALL COATINGS

Dry Fall, Latex, Eggshell: Pigmented, water-based, emulsion-type, fast-drying coating for use on interior plaster, concrete, gypsum board, primed wood, and metal ceilings.

Gloss and Sheen Level: Manufacturer's standard eggshell finish.

Water Based, Dry Fall for Galvanized Steel, Eggshell: Pigmented, water-based coating for direct application to cleaned, interior galvanized-metal ceiling surfaces and adjacent primed metals.

Gloss and Sheen Level: Manufacturer's standard eggshell finish.

PART 3 - EXECUTION

EXAMINATION

Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

Proceed with coating application only after unsatisfactory conditions have been corrected.

Application of coating indicates acceptance of surfaces and conditions.

PREPARATION

Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

INSTALLATION

Apply paints according to manufacturer's written instructions.

Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

CLEANING AND PROTECTION

After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

INTERIOR PAINTING SCHEDULE

Concrete Substrates, Nontraffic Surfaces:

- Latex System:
  - Prime Coat: Alkali-resistant, water-based primer.
  - Intermediate Coat: Matching topcoat.
  - Topcoat: Interior latex paint, eggshell.

CMU Substrates:

- Latex System:
  - Block Filler: Interior/exterior latex block filler.
  - Intermediate Coat: Matching topcoat.
  - Topcoat: Interior, latex, eggshell.

Steel Substrates:

- Water-Based Dry Fall over Shop-Applied Quick-Drying Shop Primer System:
  - Prime Coat: Quick-dry primer for shop application.
  - Topcoat: Dry fall, latex, eggshell.

Galvanized-Metal Substrates:

- Water-Based Dry-Fall System:
  - Prime Coat: Matching topcoat.
  - Topcoat: Water-based dry fall for galvanized steel, eggshell.

Aluminum (Not Anodized or Otherwise Coated) Substrates:

- Latex System:
  - Prime Coat: Quick-dry primer for aluminum.
  - Intermediate Coat: Matching topcoat.
  - Topcoat: Interior, latex, eggshell.

Finish Carpentry: Wood trim, Wood board paneling.

- Latex over Latex Primer System:
  - Prime Coat: Interior latex primer for wood.
  - Intermediate Coat: Matching topcoat.
  - Topcoat: Interior, latex, eggshell.

Gypsum Board Substrates:

- Latex over Latex Sealer System:
  - Prime Coat: Interior latex primer sealer.
  - Intermediate Coat: Matching topcoat.
  - Topcoat: Interior, latex, eggshell.

END OF SECTION

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SECTION 10 28 00
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

SUMMARY
Section Includes: Public-use washroom accessories.

ACTION SUBMITTALS
Product data.

INFORMATIONAL SUBMITTALS
Sample warranties.

CLOSEOUT SUBMITTALS
Maintenance data.

PART 2 - PRODUCTS

PERFORMANCE REQUIREMENTS
Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
Structural Performance: Design accessories and fasteners to comply with the following requirements:
Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

PUBLIC-USE WASHROOM ACCESSORIES
Grab Bar, vertical:
Mounting: Flanges with concealed fasteners.
Material: Stainless steel, 0.05 inch thick.
Finish: Smooth, ASTM A480/A480M No. 4 finish (satin).
OD: 1-1/4 inches or 1-1/2 inches, match existing grab bar diameter.
Configuration and Length: Straight, 18 inches long.

PART 3 - EXECUTION

INSTALLATION
Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

Remove temporary labels and protective coatings.

Grab Bars: Install to comply with specified structural-performance requirements.

END OF SECTION

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SECTION 30 05 00
COMMON WORK RESULTS FOR ALL EXTERIOR WORK
BASED ON DFD MASTER SPECIFICATION DATED 09/01/2015

PART 1 – GENERAL

SCOPE

This section provides information common to two or more technical site work specification sections or items that are of a general nature, and not included in other sections. This section applies to ALL work included as part of Division 31, Division 32, and Division 33. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Referenced Organizations
- Referenced Documents
- Quality Assurance
- Safety
- Permits
- Construction Limits
- Equipment & Materials Furnished by Others
- Provisions for Future Work
- Work by Others
- Submittals
- Off Site Storage
- Codes
- Certificates and Inspections
- As-Built Drawings

PART 2 - MATERIALS
- Barricades, Signs, and Warning Devices

PART 3 - EXECUTION
- Maintenance of Site and Building Access/Egress
- Continuity of Existing Traffic/Parking and Traffic Control
- Survey and Staking
- Utility Locates
- Protection and Continuity of Existing Utilities
- Protection of Existing Work and Facilities
- Stormwater/Excavation Water Management

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

31 20 00 – Earthmoving
31 22 16.15 – Roadway Subgrade Preparation
31 25 00 – Erosion Control
32 11 23.33 – Dense Graded Base
32 12 16.13 – Plant Mix Asphalt Paving
32 13 13 – Concrete Paving
32 17 23 – Pavement Markings
32 91 13 – Soil Preparation
32 92 19 - Seeding

REFERENCED ORGANIZATIONS

Abbreviations of organizations referenced in these specifications are as follows:

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
EPA	Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
WDNR	State of Wisconsin Department of Natural Resources
WISDOT	State of Wisconsin Department of Transportation

REFERENCED DOCUMENTS

Where reference is made to WisDOT or SSHSC in this specification it shall mean the pertinent sections of the Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction (SSHSC), current edition, and all supplemental and interim supplemental and interim specifications.

Where reference is made to the SSSWC, it shall mean pertinent sections of the Standard Specifications for Sewer and Water Construction (SSSWC) in Wisconsin, current edition.

Method of measurement and basis of payment sections in referenced documents shall not apply.

QUALITY ASSURANCE

Provide materials and products as required by individual specification sections. Refer to Section GC - General Conditions of the Contract regarding substitutions.

Provide quality assurance testing and reporting as required by individual specification sections.

SAFETY

Contractor is solely responsible for worksite safety.

Perform all work in accordance with applicable OSHA, state and local safety standards.

PERMITS

Unless otherwise noted in the Contract Documents, Contractor shall be responsible for obtaining and paying for all permits necessary to complete the work.

CONSTRUCTION LIMITS

Construction Limits are indicated on the drawings. In the absence of such a designation on the drawings, confine work to the minimum area reasonably necessary to undertake the work as determined by the Project Representative. In no case shall construction activities extend beyond state property lines or construction easements.

The Contractor shall restore all disturbed areas in accordance with the drawings and specifications. If drawings and specifications do not address restoration of specific areas, these areas will be restored to pre-construction conditions as approved by the Project Representative.

EQUIPMENT & MATERIALS FURNISHED BY OTHERS

Equipment and items furnished by contractor.

PROVISIONS FOR FUTURE WORK

No future work likely.

WORK BY OTHERS

Coordinate work under this project with work by Owner and other contractors on the site.

SUBMITTALS

Refer also to the General Conditions and Division 1.

Submit manufacturer's shop drawings, product data, samples, substitutions and operation and maintenance (O&M) data for approval as required by individual specification sections.

Unless otherwise noted, provide 6 copies of each submittal. Submit to project architect/engineer (A/E) unless otherwise directed by Project Representative at the Pre-Construction Meeting.

OFF SITE STORAGE

Refer to Division 1.

In general, the payments for materials stored off site will only be considered in instances where there is limited space available for storage on the site. Prior approval by the Project Representative, together with the execution of a Storage Agreement will be required.

CODES

Comply with the requirements of all applicable, local, state and federal codes.

CERTIFICATIONS AND INSPECTIONS

Refer to Section GC - General Conditions.

Obtain and pay for all required sampling, testing, inspections, and certifications except those expressly listed as provided by the A/E or other third party in the Contract Documents. Deliver originals of certificates and documents to the Project Representative within 3 days; provide copies to the A/E. Include copies of the certifications and documents in the O&M Manual.

PART 2 – MATERIALS

BARRICADES, SIGNS, AND WARNING DEVICES

Traffic barricades, traffic signs, and warning devices shall meet the requirements of applicable OSHA standards and the FHA Manual of Uniform Traffic Control Devices (MUTCD).

PART 3 - EXECUTION

MAINTENANCE OF SITE AND BUILDING ACCESS/EGRESS

Unless otherwise shown or directed, maintain existing access and egress to the facility throughout construction. Maintain ANSI A117 compliant access for disabled persons, delivery access, emergency vehicle access, and emergency egress. Do not interrupt access and egress without prior written approval from the Project Representative.

CONTINUITY OF EXISTING TRAFFIC/PARKING AND TRAFFIC CONTROL

Refer also to Section GR - General Requirements.

Do not interrupt or change existing traffic, delivery, or parking without prior written approval from the Project Representative. When interruption is required, coordinate schedule with the Owner agency to minimize disruptions. When working in public right-of-way, obtain all necessary approvals and permits from applicable municipalities and WISDOT.

When Contractor's activities impede or obstruct traffic flow, Contractor shall provide traffic control devices, signs and flaggers in accordance with other Contract Documents and the current version of the MUTCD, or as shown on the Drawings.

SURVEY AND STAKING

A/E will provide benchmarks and control points for the project as requested by the Contractor if information is available and not already shown on the plans.

Contractor shall be responsible for transferring benchmarks, control points, lines and grades to the project site as necessary to complete work.

UTILITY LOCATES

Contact Diggers Hotline at 1-800-242-8511 in accordance with statutory requirements. Request that non-member utilities, institution owned utilities, and private utilities be located by the appropriate parties. Coordinate utility locates with Wisconsin Department of Natural Resources.

Contractor shall include the costs for ***ALL*** underground utility locates in their bid. Locates shall include excavation, backfill, survey and pictures of existing utilities within the construction limits. Survey information shall include size, elevation, GPS location, materials and height and width of utility. Locates shall be authorized by Project Representative.

PROTECTION AND CONTINUITY OF EXISTING UTILITIES

Verify the locations of any water, drainage, gas, storm sewer, sanitary sewer, electric, telephone/communication, fuel, steam lines, chilled water or other utilities and site features which may be encountered in any excavations or other sitework. All lines shall be properly underpinned and supported to avoid disruption of service.

Do not interrupt or change existing utilities without prior written approval from the Project Representative, affected utilities and users. Notify all users impacted by outages a minimum of 48 hours in advance of outage. Notification shall be provided in writing and describe the nature and duration of outages and provide the name and number of Contractor's foreman or other contact.

Any service connections encountered that are to be removed shall be cut off at the limits of the excavation and capped in accordance with the requirements of applicable codes and any specifications governing such removals.

PROTECTION OF EXISTING WORK AND FACILITIES

Verify the locations of, and protect, any signs, paved surfaces, buildings, structures, landscaping, streetlights, utilities, and all other such facilities that may be encountered or interfered with during the progress of the work. Take measures necessary to safeguard all existing work and facilities that are outside the limits of the work or items that are within the construction limits but are intended to remain. Report

any damage to existing facilities to the Project Representative immediately. Correct all damages at no cost to Owner.

STORMWATER/EXCAVATION WATER MANAGEMENT

Control grading around structures, pitch ground to prevent runoff into excavated areas.

Pits, trenches within building lines and other excavations shall be maintained free of water.

Provide trenching, pumping, other facilities as needed to control stormwater runoff and excavation water.

Notify Architect/Engineer if springs or running water are encountered in excavation; provide discharge by trenches, drains, pumping to point outside of excavation. Provide information to Architect/Engineer of points and areas that water will be discharged.

Implement stormwater runoff and drainage control measures to prevent damage from flooding, erosion, and sedimentation to on-site and off-site areas during construction.

END OF SECTION

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SECTION 31 20 00
EARTHMOVING
BASED ON DFD MASTER SPECIFICATION DATED 09/01/2015

PART 1 - GENERAL

SCOPE

The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to complete earthwork required in these specifications and on the drawings. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Reference Standards
- Quality Assurance
- Submittals
- Quantities

PART 2 - MATERIALS
- Earth Fill
- Granular Fill
- Structural Fill

PART 3 - EXECUTION
- General
- Topsoil Removal
- Excavation
- Placing and Compacting Material
- Grading
- Grading Around Trees
- Soil Stabilization
- Clean Up

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Related work specified elsewhere:
Section 30 05 00 – Common Work Results For All Exterior Improvements
Section 31 20 00 – Earthmoving
Section 31 25 00 – Erosion Control

REFERENCE STANDARDS

American Society for Testing and Materials (ASTM):

D422-63	Standard Test Method for Particle Size Analysis of Soils
D4318	Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils
D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3)
D1140	Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
D1557	Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3)

D2922	Standard Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)
D3017	Standard Test Method for Water Content of Soil and Rock In-Place by Nuclear Methods (Shallow Depth)
D4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
D6913	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
E329	Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

QUALITY ASSURANCE

The Contractor shall conduct sampling, testing, and analysis as required by this section and elsewhere in the Contract Documents either by retaining the services of an independent construction materials testing consultant or with internal certified testers. The materials testing personnel shall meet the requirements of ASTM E329.

The Contractor's construction materials testing personnel shall complete material testing as outlined in Table 31 20 00 -1.

Table 31 20 00 -1

Material	Test Required	Test/Sample Frequency
Structural Fill	D422 Standard Test Method for Particle Size Analysis of Soils	1 test/500 CY placed

SUBMITTALS

Provide samples of each type of soil or aggregate proposed for use on the project. Samples shall consist of a minimum of 50 pounds of soil.

Provide copies of all material testing reports completed for the project within 48 hours of completing the individual tests. Along with each individual test result, provide a running spreadsheet of all individual test results.

QUANTITIES

Finished topsoil depth shall be as specified in Section 32 91 13 – Soil Preparation or as shown on the drawings.

Contractor shall be solely responsible for determining all earthwork quantities based on the existing and proposed elevations provided on the drawings. Any geotechnical investigations provided by the Owner apply only to those locations that the data was collected, and may not be indicative of conditions elsewhere on the site. The Contractor is responsible for collecting any additional geotechnical or survey data he deems necessary to complete an accurate estimate of earthwork quantities.

If onsite grading, excavation and borrow operations do not provide enough suitable material for fill areas, Contractor shall coordinate and pay for excavation, transport and placement of imported material meeting the specifications of the contract documents. If excavation results in excess materials, Contractor shall coordinate and pay for loading, transport and offsite disposal of excess materials.

Contractor shall notify the Project Representative immediately if geotechnical information, existing grades, or proposed grades shown on the drawings appears to be inaccurate.

PART 2 - MATERIALS

EARTH FILL

Use clean material consisting of inorganic soil or a mixture of inorganic soil and rock, stone or gravel. The material shall be free of topsoil, sod, stumps, wood, asphalt, concrete, debris, and other deleterious material. The maximum dimension of any material shall not exceed 2' in any direction.

GRANULAR FILL

Clean material meeting the requirements of "Grade 1" or "Grade 2" granular backfill as defined in WisDOT Section 209.2.1.

STRUCTURAL FILL

Clean material meeting the requirements of "Structure Backfill" as defined in WisDOT Section 210.2.1.

PART 3 - EXECUTION

GENERAL

Complete earthwork excavation for elevation changes, utility trenches, minor structures and building foundations in accordance with this section and the following applicable sections:

- Section 31 23 16.13 - Trenching
- Section 31 23 16.16 - Structure Excavation for Minor Structures

Rock excavation shall be completed in accordance with Section 31 23 16.26 - Rock Removal

TOPSOIL REMOVAL

Comply with erosion control requirements of Section 31 25 00 – Erosion Control and as shown on the plan relative topsoil removal and storage.

Complete clearing and grubbing work as required by the Contract Documents and as specified in Section 31 10 00 – Site Clearing.

Coordinate topsoil stockpile locations with Owner and other contractors working onsite.

Remove all topsoil from proposed locations of buildings, structures, roads, walks and other paved areas. Also, remove topsoil from proposed lawn or turf areas where the proposed elevation exceeds the existing elevation by 1' or greater, or where fill will be placed.

Stockpile reusable topsoil for use in restoration. Salvaged topsoil shall not be removed from the site without prior approval of the Project Representative.

Do not excavate, grade or work topsoil in frozen or muddy condition.

Minimize compaction of topsoil to the extent possible.

EXCAVATION

Excavate to the elevations shown on the drawings. Allow for placement of fill, base course, pavements, and topsoil as required by the drawings and other Contract Documents.

Transfer lines and grades as shown on the drawings.

Excavate areas to provide positive drainage. Contractor shall notify the Project Representative immediately if the final proposed elevations shown on the drawings do not provide drainage away from buildings, structures, roads, walks and other paved areas.

Remove excess and spoil material from the site in a timely fashion.

Do not excavate below design grades without prior authorization by the Project Representative.

PLACING AND COMPACTING MATERIAL

Place material in fill areas only after all topsoil has been removed.

Place fill to the elevations shown on drawings; allow for placement of base course, pavements and topsoil as required by the drawings and other Contract Documents.

Fill type shall be as indicated on Table 31 20 00 -2, or as shown on the drawings.

Do not place fill on areas consisting of organic soil, debris or soft and yielding material.

Do not place fill on frozen or muddy areas.

Moisture condition subgrade as necessary to provide a firm surface prior to placing fill.

Place fill in horizontal lifts having thickness as shown on Table 31 20 00 - 2.

Compact fill material as required by Table 31 20 00 - 2 for given use.

Moisture condition fill material as necessary to achieve density required for given use.

Place and compact backfill so as to minimize settlement and avoid damage to walls, utility lines and other work in place. Place backfill simultaneously on both sides of free-standing structures.

It is the responsibility of the Contractor to provide all necessary compaction equipment and other grading equipment that may be required to obtain the specified compaction. Compaction of controlled backfill by travel of grading equipment will not be considered adequate for uniform compaction. Hand guided vibratory or tamping compactors will be required whenever controlled backfill may be placed adjacent to walls, footings, and columns or in confined areas.

Table 31 20 00 -2

Location	Required Material	Maximum Compacted Lift Thickness	Minimum Proctor Compaction	Minimum Relative Density [(a)]
Areas Beneath Footings, Floor Slabs, or Structures	Structural Fill	8”	95% Modified	70%
Footing, Foundation and Structure Backfill	Structural Fill	8”	95% Modified	70%
Areas within 10’ of Existing or Proposed Building or Structure Footing or Slab	Granular Fill	12”	90% Modified	60%
Turf Areas	Earth Fill	12”	85 % Modified	50%

(a) Minimum relative density as determined by ASTM D-4253 for coarse-grained soils with less than 15% by mass passing the No. 200 (75-µm) sieve. Applicable only when minimum proctor compaction cannot be achieved.

GRADING

Grading shall include areas necessary to establish new grades as required, additional areas disturbed by construction activities, storage, equipment including all trenching, where excess fill is deposited and where cutting is required.

New grades are designed to produce desired configuration of site and do not represent a balance between cut and fill.

Excavated materials shall be disposed of by contractor at a suitable off-site location. Contractor shall be responsible for securing suitable disposal site(s) and for all off-site disposal costs.

Grades not indicated shall be uniform levels or slopes between point elevations as shown. Adjust all grades as necessary to provide positive drainage away from structures.

Grades for earthwork shall not deviate from established elevations, as shown in excess of 1 inch unless otherwise directed by Project Representative.

Do all cutting, filling, compacting fill, rough grading required to bring entire project to within respective base course elevations or 6 inches below finished topsoil elevations.

GRADING AROUND TREES

Limit excavation, filling and grading near trees or other vegetation to the extent possible. When tree roots are encountered, cut roots cleanly and squarely.

For trees within the grading limits that are to remain, install tree protection fencing as noted in the drawings.

SOIL STABILIZATION

Notify the Project Representative if a solid subgrade cannot be established through drying and grading.

CLEAN UP

Level off all waste disposal areas and clean up all areas used for the storage of materials or the temporary deposit of excavated earth. Remove all surplus material, tools and equipment.

Thoroughly clean all drainage ways, roads, parking lots, sidewalks, and paved surfaces and remove and dispose of all debris and mud.

END OF SECTION

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SECTION 31 22 16.15
ROADWAY SUBGRADE PREPARATION
BASED ON DFD MASTER SPECIFICATION DATED 03/09/2016

PART 1 - GENERAL

SCOPE

The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to complete pavement subgrade preparation and provide a surface ready for constructing and supporting the Dense Graded Base, as required in these specifications, on the drawings and as otherwise deemed necessary to complete the work. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Reference Documents
- Quality Assurance
- Permits/Fees

PART 2 - MATERIALS
- Breaker Run Aggregate
- Recycled Aggregate Products and Materials
- Geotextile Fabric

PART 3 - EXECUTION
- Preparation
- Excavation
- Preparing the Foundation
- Subgrade Approval/Proof-Rolling
- Undercutting/Excavation Below Subgrade (EBS)
- Restoration

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Related work specified elsewhere:
Section 30 05 00 – Common Work Results For All Exterior Improvements
Section 31 20 00 – Earthmoving
Section 31 25 00 – Erosion Control
Section 32 11 23.33 – Dense Graded Base
Section 32 13 13 SF – Concrete Paving

REFERENCE DOCUMENTS

Where these specifications do not cover portions of the work to be undertaken, the SSHSC in Wisconsin, current edition, shall govern the work.

QUALITY ASSURANCE

The Contractor shall conduct sampling, testing, and analysis as required by this section and elsewhere in the Contract Documents either by retaining the services of an independent construction materials testing consultant or with internal certified testers. The materials testing consultant shall meet the requirements of ASTM E329.

The A/E and Contactor's construction materials testing personnel shall observe all proof-rolling operations. The Project Representative shall also be informed of all proof-rolling operations. Provide minimum of 48 hours confirmed notice for all parties.

PERMITS/FEES

Contractor shall be solely responsible for obtaining all permits necessary to complete the work. Contractor shall pay all fees associated with obtaining permits. These include, but are not limited to permits for work within public right-of-way, land disturbance permits and building permits.

PART 2 - MATERIALS

BREAKER RUN AGGREGATE

Crushed stone, rock or gravel meeting the requirements of either Breaker Run or Select Crushed material as defined in WisDOT Section 311.2 or WisDOT Section 312.2, respectively.

RECYCLED AGGREGATE AND PAVEMENT

Recycled or salvaged aggregate and pavement products shall be free of organics, clay, rocks greater than 3-inches in least dimension and all other deleterious materials. The successful Bidder may submit specifications for these materials for consideration by the A/E for use on the project as part of the submittal process following contract award.

GEOTEXTILE FABRIC

Fabric shall be insect, rodent, mildew, and rot resistant woven or nonwoven polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride. All fabric shall have the minimum strength values in the weakest primary direction. Fabric shall conform to WisDOT Section 645.2.8.

PART 3 - EXECUTION

PREPARATION

Review drawings and prepare work plan and schedule. Coordinate any necessary interruptions in site access with Project Representative, in accordance with other specification sections.

Remove topsoil from work area. Sawcut and remove pavement from work area as indicated on the drawings. Sawcuts shall be made for the full depth of pavement.

Grade roadways and parking areas to drain water away from buildings.

EXCAVATION

Excavate to elevations and dimensions as shown on the drawings and as necessary to complete construction. Excavations shall be sufficiently deep to provide for depth of base course and pavement.

Stones over 6-inches in size shall be removed from the loosened portion of the subgrade.

Notify Project Representative if correction of unauthorized excavation or over-excavation is necessary. Said excavations will be corrected by placement of Breaker Run Aggregate. Contractor will be responsible for all costs associated with correcting these excavations.

Segregate the various materials excavated. Excavated material that does not meet the requirements of backfill and excess excavated material, shall be removed from the site and disposed by the Contractor, unless directed otherwise by other specification sections or the Project Representative.

Locate spoil piles so they do not interfere with public travel, adjacent landowners or other construction activities.

PREPARING THE FOUNDATION

The subgrade shall be constructed to have a uniform stability throughout. Use of recycled and salvaged aggregate and pavements shall be fully incorporated into subgrade soil. Construct the foundation to the required elevation with equipment and methods adapted for the purpose. Shape and compact to provide a smooth foundation, at required density, and at the proper elevation to receive the Dense Grade Base (See Section 32 11 23.33).

Compact material to minimize settlement and avoid damage to structures, pipes, utility lines and other features. Hand-place and compact material as necessary.

It is the responsibility of the Contractor to provide all necessary compaction equipment and other grading equipment that may be required to obtain a subgrade that satisfies the conditions of a satisfactory subgrade as defined below. Vibratory plate or tamping type walk behind compactors will be required whenever backfill is placed adjacent to structures, pipes, utility lines and other features.

The prepared foundation shall be tested for compaction as defined in the paragraph entitled 'Subgrade Approval / Proof Rolling'.

SUBGRADE APPROVAL / PROOF ROLLING

Prior to undercutting or excavating below subgrade (EBS) or placing any Dense Grade Base (See Section 32 11 23.33), contact the Project Representative to schedule inspection of the subgrade and proof rolling of the subgrade. All proof rolling shall be completed in accordance with the requirements of the paragraph entitled 'Quality Assurance' and shall meet the criteria as defined below.

To complete proof rolling, entire pavement subgrade shall be provided with a relatively smooth surface, suitable for observing soil reaction during proof rolling.

Contractor shall schedule and provide a fully loaded tri-axle dump truck for proof – rolling. Loaded truck shall have a minimum gross operating weight of 30 tons. Test shall be conducted with "tag" or "pusher" axles retracted from the ground.

Proof rolling shall be accomplished in a series of traverses parallel to the centerline of the driveway, street, or parking area. The truck shall traverse the length of the street or parking area once for each 12' of width at speeds less than 5 mph. Additional passes along the traverse shall be completed as directed by the Project Representative to further define unsatisfactory subgrade.

Soft areas, yielding areas, cracked areas or areas where rolling or wave action is observed shall be considered indicative of an unsatisfactory subgrade. Such areas shall be undercut as outlined in subsequent subsections of this specification.

Once the subgrade has been proof-rolled and approved, protect the soils from becoming saturated, frozen, or adversely altered.

UNDERCUTTING/EXCAVATION BELOW SUBGRADE (EBS)

Undercutting/EBS shall be completed only when directed by the Project Representative or if unsatisfactory subgrade, as defined above, is observed. The Contractor shall not be compensated for any unauthorized undercutting/EBS. Measure and document undercut areas and depths in consultation with Project Representative.

Excavate undercut areas to the depth specified by A/E or Project Representative using equipment with smooth cutting edge. Excavated undercut material that does not meet the specifications for fill needed elsewhere on site shall be removed from the site and legally disposed.

Undercut areas shall be backfilled with Breaker Run (or with a combination of Breaker Run and Geotextile Fabric) in maximum of 9 inch thick lifts (compacted). Breaker Run shall be compacted to 90% Modified Proctor dry density.

Following installation and compaction of place Breaker Run material, the area shall be subject to the work defined in the paragraph entitled 'Subgrade Approval / Proof – Rolling'.

Undercutting/Excavation Below Subgrade (EBS) work shall include all materials, labor, equipment and supervision necessary to remove the soils from the Project Site considered to be poor from the proof roll and backfill and compact with Breaker Run material brought to the Project Site. The cost of the compacted Breaker Run material is incidental to the unit price item for Undercutting/Excavation Below Subgrade (EBS). If Geotextile Fabric is required and is used in combination with the Breaker Run, the unit price for the Geotextile Fabric shall include all materials, labor and equipment for installation.

RESTORATION

Roll all pavement subgrade surfaces using a smooth drum roller to promote an impervious surface and minimize percolation of water into the subgrade.

END OF SECTION

SECTION 31 23 16.16
STRUCTURAL EXCAVATION FOR MINOR STRUCTURES

PART 1 - GENERAL

SCOPE

The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to complete trenching for utilities and other work, as required in these specifications, on the drawings and as otherwise deemed necessary to complete the work. Included are the following topics:

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Related work specified elsewhere:
Section 02 41 13 – Demolition
Section 30 05 00 – Common Work Results For All Exterior Improvements
Section 31 20 00 – Earthmoving
Section 31 25 00 – Erosion Control

REFERENCE STANDARDS

American Society for Testing and Materials (ASTM):

D422-63	Standard Test Method for Particle Size Analysis of Soils
D4318	Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils
D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3)
D1140	Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
D1557	Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3)
D2922	Standard Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)
D3017	Standard Test Method for Water Content of Soil and Rock In-Place by Nuclear Methods (Shallow Depth)
D4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
D6913	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis

E329 Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

QUALITY ASSURANCE

The Contractor's construction materials testing personnel shall complete material testing as outlined in Table 31 23 16.16 -1.

Table 31 23 16.16 -1

Material	Test Required	Test/Sample Frequency
Granular or Structural Backfill [(1)]	*ASTM D422-63Standard Test Method for Particle Size Analysis of Soils*	*0 tests: 0-500 cy* *1 test: 500-3000 cy*
	ASTM D1140 Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75-µm) Sieve in Soils by Washing	*"*
Granular or Structural Backfill	*ASTM D6938 Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)*	*0 tests: 0-500 cy* *1 test: 500-3000 cy*

(1) Tests shall meet the requirements for gradation as listed in WisDOT Section 209.2 and 210.2.

PART 2 - MATERIALS

GRANULAR FILL

Clean material meeting the requirements of "Grade 1" or "Grade 2" granular backfill as defined in WisDOT Section 209.2.1.

STRUCTURAL FILL

Clean material meeting the requirements of "Structure Backfill" as defined in WisDOT Section 210.2.1.

PART 3 - EXECUTION

PREPARATION

Review drawings and prepare work plan and schedule. Coordinate any necessary interruptions in utility service with Owner, in accordance with other specification sections.

Contact Diggers Hotline. Locate and protect utilities, structures, pavement, trees, landscaping, benchmarks and other features in the work area.

Layout work according to drawings. Establish and transfer lines and grades as necessary to complete the work.

Remove topsoil from work area in accordance with Section 31 20 00 – Earthwork. Sawcut and remove pavement from work area in accordance with Section 02 41 13 – Demolition.

Support existing buildings, utilities and structures as necessary prior to beginning building excavation.

Grade area surrounding excavation to drain water away from excavation.

EXCAVATION

Excavate to elevations and dimensions necessary to complete construction. Excavations shall be sufficiently deep to provide for foundations, footings, slabs, and any required base material.

Do not excavate material from under the 45 degree bearing splay beneath existing foundations or footings.

Notify A/E if correction of unauthorized excavation or over-excavation is necessary. Said excavations will be corrected based on recommendations of Civil Engineer consultant. Contractor will be responsible for all costs associated with correcting these excavations.

Segregate the various materials excavated. Reserve material meeting the requirements of backfill for the project location. Excavated material that does not meet the requirements of backfill, and excess excavated material, shall be removed from the site and disposed by the contractor unless directed otherwise by other specification sections or the A/E.

Locate bedding, backfill and spoil piles in accordance with OSHA requirements, and so that it does not interfere with public travel, adjacent landowners or other construction activities.

BEARING SURFACE REVIEW

Prior to over-excavating below the proposed bearing surface grade, or modifying bearing surface soil, contact A/E to schedule inspection. Provide minimum of 24 hours confirmed notice.

Provide smooth soil surface at bearing surface grade, unless otherwise required by site-specific geotechnical reports. Hand trim excavation, remove loose material, lumped subsoil, rock and boulders from the bearing surface.

Once the bearing surface grade is established, protect the soils from becoming saturated, frozen, or adversely altered. Do not allow soils from the sidewall of the excavation to spall and fall onto the bearing surface.

CONSTRUCTION OF FOUNDATIONS, FOOTINGS AND SLABS

Construct foundations, footings and slabs in accordance with the drawings and pertinent specification sections.

Do not allow excavation sidewall soils to spall into excavation.

Do not allow water to collect in excavation.

Protect base of excavation from freezing.

Install waterproofing and foundation drainage system in accordance with drawings.

BACKFILL AND COMPACTION

Remove all forms, bracing, staking and other construction materials from the excavation prior to initiating backfilling.

Excavation shall be reasonably free of water prior to beginning backfilling. Do not place material on frozen surfaces or use frozen material.

Backfill excavation using the material specified on Table 31 23 16.16 - 2, or as shown on the drawings.

Compact fill material as required by Table 31 23 16.16 - 2 for the given use.

Moisture condition backfill material as necessary to achieve density required for given use.

Place and compact material to minimize settlement and avoid damage to structures, pipes, utility lines and other features. Hand-place and compact material as necessary.

Place backfill simultaneously on both sides of structures.

Backfill trenches to elevations shown on the drawings; allow for placement of base course, pavements, and topsoil as required by the drawings and other Contract Documents. Where final restoration will be delayed, backfill excavation to existing grade to provide a safe, free-draining surface.

It the responsibility of the Contractor to provide all necessary compaction equipment and other grading equipment that may be required to obtain the specified density. Vibratory plate or tamping type walk behind compactors will be required whenever backfill is placed adjacent to structures, pipes, utility lines and other features.

Flooding or jetting of backfill material for compaction purposes is not allowed.

Table 31 23 16.16 -2

Location	Required Material	Maximum Compacted Lift Thickness	Minimum Proctor Compaction	Minimum Relative Density [(a)]
Areas Beneath Footings, Floor Slabs, or Structures	Structural Fill	6”	95% Modified	70%
Footing, Foundation and Structure Backfill	Structural Fill	6”	95% Modified	70%
Areas within 10’ of an Existing or Proposed Building or Structure Footing or Slab	Granular Fill	8”	90% Modified	60%
Areas Beneath Existing or Proposed Pavement (Roads, Drives, Walks)	Granular Fill	8”	90% Modified	60%
Turf Areas	Earth Fill	12”	85 % Modified	50%

(a) Minimum relative density as determined by ASTM D-4253-00 for coarse-grained soils with less than 15% by mass passing the No. 200 sieve. Applicable only when minimum proctor compaction cannot be achieved.

RESTORATION

Restore structure excavation to proposed grades and surfaces as soon as practicable after backfilling.

Remove excess backfill and spoil material from the site as soon as possible after backfilling is complete, but no later than 2 calendar days after backfilling is complete.

Thoroughly clean all drainage ways, roads, parking lots sidewalks and paved surfaces and remove and dispose all debris and mud.

END OF SECTION

SECTION 31 25 00
EROSION CONTROL
BASED ON DFD MASTER SPECIFICATION DATED 02/17/2016

PART 1 - GENERAL

SCOPE

The work under this section consists of providing all work, materials, labor, equipment, and supervision necessary to provide and construct erosion control measures necessary to protect property and the environment. Included are the following topics:

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Related work specified elsewhere:
Section 30 05 00 – Common Work Results For All Exterior Improvements
Section 31 20 00 - Earthmoving
Section 32 91 13 – Soil Preparation
Section 32 92 19 – Seeding

Provide erosion control in accordance with the following references:

- Erosion Control Product Acceptability List (“PAL”), current version as published by the WisDOT.
- Construction Site Erosion & Sediment Control Technical Standards, current version as published by the Wisconsin Department of Natural Resources WDNR.
- Storm Water Post-Construction Technical Standards, current version as published by the WDNR.

Method of measurement and basis of payment sections in any referenced erosion control documents shall not apply to this contract.

REFERENCE DOCUMENTS

Wherever PAL appears in this specification, it shall mean the Wisconsin Department of Transportation, Erosion Control Product Acceptability List (PAL), current edition.

SUBMITTALS

Submit shop drawings for the following erosion control features:

As shown of the approved plan.

EROSION CONTROL PLAN

The A/E has prepared an erosion control plan for the project. [The A/E will complete, apply for, and pay for a Water Resources Application for Project Permits (WRAPP) to obtain acceptance for land disturbing activities in excess of 1 acre from the WDNR.] The Contractor will provide the A/E with submittals for materials used to implement the erosion control plan, as well as any modifications to the erosion control plan that are necessary due to the Contractor's means and methods of construction.

Contractor shall comply with all the requirements of the erosion control plan, [and if applicable, the Construction Site Storm Water Runoff General Permit requirements as obtained from the WRAPP. Contractor shall be responsible for completing all construction site inspection reports for the duration of the project and the Notice of Termination form required by the WDNR].

Contractor shall provide all erosion control measures necessary as noted in the drawings and defined in the specifications to protect property and the environment. Apply and pay for erosion control or land disturbing permits as required by local municipalities and state agencies.

PART 2 – MATERIALS

GENERAL

Erosion mats, soil stabilizers, and tackifiers shall be listed on the Wisconsin Erosion Control Product Acceptability List (PAL) as published by the Wisconsin Department of Transportation.

When the design or contract includes permanent erosion control or stormwater control features, the contractor may employ these items in his control of erosion and stormwater during his construction activities. However, these items shall be fully cleaned, restored, and in every way fully functioning for its intended permanent use prior to acceptance of the work.

GEOTEXTILE FABRIC

Type FF geotextile fabric meeting the requirement of the PAL shall be used for inlet protection.

SILT FENCE

Fence fabric shall comply with the requirements of Standard Specifications for Highway and Structure Construction 628.2.6, in 3 foot tall rolls, with 4' tall 2" x 2" nominal cross section hardwood posts spaced a maximum of 10' o.c. Silt fence shall be Mirafi, Trevira, Amoco, CFM, or approved equal.

EROSION MAT

A light duty, organic mat encased in a light weight photodegradable or biodegradable netting on both the bottom and top sides. Erosion mat shall comply with the requirements of Class I; Type A erosion mat as

defined by Standard Specifications for Highway and Structure Construction and the PAL. Erosion mat shall be American Excelsior, Erosion Control Systems, North American Green, or approved equal.

For environmentally sensitive areas that have a high probability of trapping animals or for establishing natural areas with taller vegetation it is recommended that an urban mat is used. Erosion mat shall comply with the requirements of Class I; Urban Type B erosion mat as defined by Standard Specifications for Highway and Structure Construction and the PAL. Erosion mat shall be American Excelsior-Curlex Net-Free, Erosion Control Blanket-S32BD, Western Excelsior-Excel SS-2 All Natural, Ero-Guard EG-25 (NN), Erosion Tech ETRS2BN or approved equal.

STAPLES

Use staples conforming to Standard Specifications for Highway and Structure Construction 628.2.3 to anchor erosion mat. Staples shall be U-shaped of No. 11 gauge or heavier steel wire, or other approved materials, with a width of one to two inches, and a length of not less than 6 inches for firm soils and not less than 12 inches for loose soils.

Use biodegradable staples in accordance with manufacturer's recommendations for anchoring urban erosion mats. Acceptable anchoring devices are listed in the PAL. Wood and metal staples are not allowed for use with urban erosion mats.

RIPRAP

Riprap shall be the class specified in the plan and shall conform to Standard Specifications for Highway and Structure Construction 606.2. If a class is not specified in the plan, medium riprap shall be used.

SOIL STABILIZERS

Soil stabilizers shall be non-asphalt-based products of the type specified, and meeting the requirements of the PAL.

SOIL TACKIFIERS

Soil tackifiers shall be non-asphalt-based products of the type specified, and meeting the requirements of the PAL.

PART 3 - EXECUTION

GENERAL

Install erosion control measures as required by the erosion control plan and contract documents. Provide additional erosion control measures as dictated by Contractor's means and methods, or by differing site conditions. Notify Project Representative of additional erosion control features that are provided, but not shown on the plan.

Contractor shall provide all erosion control measures necessary to protect property and the environment. Perform all work in accordance with manufacturer's instruction where these specifications do not specify a higher requirement.

GRADING AND EARTHWORK

Install all temporary or permanent erosion control measures prior to any onsite grading or land disturbances.

Clear only those areas designated for the placement of improvements or earthwork before placement of the final cover. Perform stripping of vegetation, grading, excavation, or other land disturbing activities in a

logical sequence and manner which will minimize erosion. If possible, schedule construction for times of the year when erosion hazards are minimal.

Do not clear the site of topsoil, trees, and other natural ground covers before the commencement of construction. Retain natural vegetation and protect until the final ground cover is placed.

Do not stockpile soil within 25 feet of any roadway, parking lot, paved area, or drainage structure or channel. Provide temporary stabilization and control measures (seeding, mulching, covering, erosion matting, barrier fencing) for the protection of disturbed areas and soil piles which will remain unfinished for a period of more than 14 consecutive calendar days.

Remove surplus excavation materials from the site immediately after rough grading. The disposal site for the surplus excavation materials shall also be subject to these erosion control requirements.

DRAINAGE

Minimize water runoff and retain or detain on-site whenever possible so as to promote settling of solids and groundwater recharge.

Convey drainage to the nearest adequate public facility. Do not discharge water in a manner that will cause erosion or sedimentation of the site or receiving facility.

Protect storm sewer inlets and catch basins in accordance with the erosion control plan, if provided. If not specified, protect inlets with straw bale barriers, silt fencing, filter basket, gabion stone weepers, or other equivalent methods approved by the A/E which provide the necessary erosion protection.

Divert roof drainage and runoff from all areas upslope of the site around areas to be disturbed or channel them through the site in a manner that will not cause erosion.

Minimize the pumping of sediments when dewatering. Discharge to a sedimentation basin or sedimentation vessel to reduce the discharge of sediments. Do not discharge water in a manner that will cause erosion or sedimentation of the site or receiving facility.

TRACKING CONTROL

Provide each entrance to the site with a stone tracking pad. Tracking pad shall be constructed of Gabion Stone or Breaker Run.

If necessary, provide a crushed aggregate paved parking area.

If applicable, wash water shall be discharged to sedimentation basins, sedimentation vessels, or other such control areas. Untreated wash water shall not be discharged to storm sewers or surface water bodies.

MAINTENANCE

Inspect all erosion control measures within 24 hours of the end of each rainfall event that exceeds 0.50” or daily during period of prolonged rainfall, or weekly during periods without rainfall. Immediately repair and/or replace any and all damaged, failed, or inadequate erosion control measures.

Maintain records of all inspections and any remedial actions taken.

Maintain stockpile stabilization measures as necessary after rainfall events and heavy winds. Replace tarps, re-seed, and reapply mulch, tackifiers and stabilizers as necessary.

Remove sediment from stormwater and erosion control structures, basins and vessels as necessary.

Repair or replace damaged inlet protection.

Replace or supplement stone tracking pads with additional stone when they become ineffective.

Remove any sediment reaching a public or private roadway, parking lot, sidewalk, or other paved. Do not remove tracked sediments by flushing. Completely remove any accumulations not requiring immediate attention at least once daily at the end of the workday.

Frequently dispose of all waste and unused construction materials in licensed solid waste or wastewater facilities. Do not bury, dump, or discharge, any garbage, debris, cleaning wastes, toxic materials, or hazardous materials on the site, on the land surface or in detention basins, or otherwise allow materials to be carried off the site by runoff onto adjacent lands or into receiving waters or storm sewer systems.

END OF SECTION

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SECTION 32 11 23.33
DENSE GRADED BASE
BASED ON DFD MASTER SPECIFICATION DATED 09/01/2015

PART 1 - GENERAL

SCOPE

The work under this section consists of constructing a dense graded base using crushed stone or crushed gravel. The Contractor may also use crushed concrete, reclaimed asphaltic pavement, reprocessed material, or blended material. The work under this section shall provide a surface ready for constructing and supporting the Concrete or Asphalt Pavement.

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Related work specified elsewhere:
Section 30 05 00 – Common Work Results For Exterior Work
Section 32 12 16 -- Plant Mix Asphalt Paving
Section 32 13 13 SF – Concrete Paving

REFERENCE STANDARDS

American Society for Testing and Materials (ASTM):

D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods
E329	Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

QUALITY ASSURANCE

The Contractor shall conduct sampling, testing, and analysis as required by this section and elsewhere in the Contract Documents either by retaining the services of an independent construction materials testing consultant or with internal certified testers. The materials testing personnel shall meet the requirements of ASTM E329.

The Contractor's construction materials testing personnel shall complete one of the material testing methods as outlined in Table 32 11 23.33-1.

Table 32 11 23.33 -1

Material	Test Required	Test/Sample Frequency
1¼-inch Base Aggregate Dense	ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort	1 test/500 CY placed
1¼-inch Base Aggregate Dense	ASTM D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods	1 test/500 CY placed

SUBMITTALS

Provide copies of all material testing reports completed for the project within 48 hours of completing the individual tests. Along with each individual test result, provide a running spreadsheet of all individual test results.

PART 2 - MATERIALS

DENSE GRADED BASE

Use dense graded base ***1-1/4 -inch.*** Provide aggregate conforming to WisDOT Section 301.2 of the SSHSC for crushed stone, crushed gravel, crushed concrete, reclaimed asphaltic pavement, reprocessed material or blended material. Material gradations shall conform to WisDOT Section 305.2.2 of the SSHSC unless specified elsewhere in the contract documents.

PART 3 - EXECUTION

CONSTRUCTION

Preparing the Foundation

Refer to Section 31 22 16.15 – Roadway Subgrade Preparation.

Pulverized and Re-laid Pavement

Pulverize the existing asphaltic pavement full depth according to WisDOT Section 325.3 of the SSHSC.

Placing Dense Graded Base Aggregate

Construct Dense Graded Base as specified in WisDOT Section 305.3 of the SSHSC. Compact each base layer, including shoulder foreslopes, with equipment specified in WisDOT Section 301.3.1 of the SSHSC.

Use standard compaction conforming to WisDOT Section 301.3.4.2 of the SSHSC, unless otherwise specified herein. Final shaping of shoulder foreslopes does not require compaction.

Construct the base to the width and section the drawings show. Shape, and compact the base surface to within 0.04 feet of the drawing elevation.

Ensure there is adequate moisture in the aggregate during placing, shaping, and compacting to prevent segregation and achieve adequate compaction. Moisture condition dense graded base as necessary to achieve required density as determined by ASTM D1557.

Excavation shall be reasonably free of water prior to placement of dense graded base. Do not place dense graded base on frozen surfaces or use frozen material.

Maintain the base until paving over it, or until the DFD Project Representative accepts the work, if paving is not part of the contract.

Placing Dense Graded Base Shoulders

If the roadway is closed to through traffic during construction, construct the aggregate shoulders before opening the road to traffic.

If the roadway remains open to through traffic during construction and a 2-inch or more drop-off at the pavement edge exists; eliminate the drop-off within 48 hours after completing the asphalt or concrete work. Unless the special provisions specify otherwise, provide aggregate shoulder material compacted to a 4:1 or flatter cross slope from the surface of the pavement edge.

Provide and maintain signing and other traffic protection and control devices, as specified in WisDOT Section 643 of the SSHSC, until completing shoulder construction to the required cross-section and flush with the asphaltic pavement or surfacing.

Construct aggregate shoulders to the elevations and typical sections the drawings show, except for minor modifications needed to conform to other work. Use equipment that does not damage or mar the pavement surface, curbs, or appurtenances.

Place aggregate directly on the shoulder area between the pavement edge and the outer shoulder limits. Recover uncontaminated material deposited outside the limits and place within the limits.

Do not deposit aggregate on the pavement during placement, unless the A/E specifically allows. Do not leave aggregate on the pavement overnight. After placing the shoulder aggregate, keep the pavement surface free of lose aggregate.

COMPACTION

Compacting Dense Graded Base Aggregate

If using a pneumatic roller, do not exceed a compacted thickness of 6 inches per layer. For the first layer placed over a loose sandy subgrade, the Contractor may, with A/E approval, increase the compacted layer thickness to 8 inches. If using a vibratory roller, do not exceed a compacted thickness of 8 inches per layer.

The material shall be compacted to meet the following:

Test Method to determine maximum density and moisture	ASTM D1557
Relative compaction relative to the optimum	95%
Moisture content relative to the optimum	-2% to +2%

The compacted material shall be tested for in-place field density in accordance with this Section, Part I, Quality Assurance.

Compacting Dense Graded Base Shoulders

Spread and compact the aggregate in compacted layers of 6 inches or less to 95% of the modified maximum density prior to placing each subsequent layer.

After final compaction, shape the shoulders to remove all longitudinal ridges to ensure proper drainage.

CLEANUP

After the project is completed, thoroughly clean up all debris which may have accumulated during the placement of dense graded base and breaker run, if placed. All storm sewer manholes, inlets, and trench drains within the project area shall be inspected in the presence of the DFD Project Representation, the Owner Agency, and the A/E to confirm there is no accumulated debris. The Contractor shall ensure the manholes, inlets, and trench drains are free of water and debris prior to inspection by the parties noted above. Any accumulated debris in the manholes, inlets, and trench drains shall be removed and properly disposed of by the Contractor.

Replace or repair as required, all surfaces and/or landscape features damaged or disturbed under this item of work.

END OF SECTION

SECTION 32 12 16. 13
PLANT MIX ASPHALT PAVING
BASED ON DFDM MASTER SPECIFICATION DATED 12/12/2017

PART 1 - GENERAL

SCOPE

The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide and construct the paving and surfacing as provided for in these specifications and on the drawings. Included are the following topics:

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Related Work Specified Elsewhere:
Section 30 05 00 – Common Work Results for all Exterior Work
Section 32 11 23.33 – Dense Graded Base
Section 32 13 13 SF – Concrete Paving

PART 2 - MATERIALS

RECYCLED PRODUCTS AND MATERIALS

The Wisconsin Department of Administration, Division of Facilities Development and Management (DFDM) strongly encourages the use of recycled materials and products containing recycled materials. Bidders may submit specifications for recycled materials and products containing recycled materials for consideration by the DFDM for use on the project as part of the submittal process following the contract award.

HOT MIX ASPHALTIC (HMA) PAVEMENT

Provide HMA pavement thickness and type as indicated on the plan and conforming to the requirements of WisDOT SSHSC Section 450 and Section 460. Utilize the same material type throughout the paving operation unless noted elsewhere on the drawings. Ensure all asphaltic materials provided under this section conform to the requirements of WisDOT SSHSC, Section 455 and as revised in any current Supplemental Specifications.

TACK COAT

Apply tack coat at a minimum rate of 0.05 gallons per square yard to the lower layer(s) of HMA pavement surface prior to placing surface layer of HMA pavement, unless otherwise noted. Tack coat shall require a minimum asphalt content of 50% and meet all other requirements of the WisDOT SSHSC Section 455.

PART 3 - EXECUTION

HOT MIX ASPHALT (HMA) PAVEMENT

Complete all work under this section to WisDOT SSHSC, Section 450 and Section 460. Provide HMA layer thicknesses as shown on the drawings. The minimum thickness of the HMA binder layer shall not be less than 1-3/4 inches (12.5 mm nominal aggregate size). The minimum thickness of the HMA surface layer shall not be less than 1-1/2 inches (9.5 mm nominal aggregate size).

REHEATING JOINTS

Prior to placing HMA pavement adjacent to a section of HMA pavement that was placed during a previous phase; reheat the abutting edge of the previously placed and compacted layer just prior to placing the new HMA pavement layer.

Provide a self-contained heating unit that heats by convection only. Do not use forced air to enhance the flame. Provide a fireproof barrier between the flame and the heater's fuel source. The heater must produce a uniform distribution of heat within the heat box. Provide automatic controls to regulate the heater output and shutoff the heater when the paver stops or the heater control system loses power. Mount the heater on the paver inside the paver's automatic leveling device.

Evenly reheat at least an 8 inch wide strip of the previously compacted layer in the adjacent lane. Reheat the joint to within 60 degrees F of the mix temperature at the paver auger. Joint temperature is to be measured immediately behind the heater.

The A/E or Project Representative may modify the required joint reheat temperatures to adjust for weather, wind, and other field conditions. Coordinate the heater output and paver speed to achieve the required joint reheat temperature without visible smoke emission.

PAVEMENT REPAIRS

Sawcut all pavement surfaces to neat and straight lines at the limits of removal by a two-step method. Limit the initial pavement removal to the immediate area of the proposed work. Full depth sawcutting is not required for this phase of removal. After the work is completed, make a full depth sawcut to neat and straight lines outside the widest point of pavement disruption. Sawcut the lines of the repair parallel to existing joints, or parallel to or perpendicular to pavement edges so as to form a neat patch. Carefully remove all remaining pavement within the sawcut area to the lines of the sawcut. Do not disturb the existing base materials between the area disturbed by the work and the sawcut line by the sawcutting, pavement removal, or pavement replacement processes.

Remove all walks, curbs, and other jointed paving by sawcutting at the nearest joint beyond the limits of removal.

Adjust all inlets, manholes, catch basins, valve boxes, and other such castings to match new finished grade as incidental work.

Clean and fill all major structural cracks (not alligatored areas) with crack filler conforming to ASTM D-3405 prior to placing new HMA pavement overlay. Place tack coat on all surfaces in accordance with WisDOT SSHSC Section 455. Apply emulsified asphalt tack coat at the rate of 0.05 gallons per square yard to the existing asphalt surface.

Place HMA binder course in all areas undergoing removal and replacement and in areas receiving new HMA surface course. Remove existing gravel as necessary to allow placement of binder course in lift thicknesses as shown on the drawings.

Place HMA surface course on all roadway, parking lots, service drives, and loading dock areas as designated on the drawings.

END OF SECTION

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SECTION 32 13 13
CONCRETE PAVING

PART 1 - GENERAL

SUMMARY

Section Includes Concrete Paving

- Driveways.
- Roadways.
- Parking lots.
- Curbs and gutters.
- Walks.

ACTION SUBMITTALS

Product Data: For each type of product.

Samples: For each type of product, ingredient, or admixture requiring color selection.

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

QUALITY ASSURANCE

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

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

PRECONSTRUCTION TESTING

Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on concrete paving mixtures.

PART 2 - PRODUCTS

CONCRETE, GENERAL

ACI Publications: Comply with ACI 301 unless otherwise indicated.

CONCRETE MATERIALS

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

- Portland Cement: ASTM C 150/C 150M, white portland cement Type I .
- Fly Ash: ASTM C 618, Class C
- Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
- .

Normal-Weight Aggregates: ASTM C 33/C 33M, uniformly graded. Provide aggregates from a single source.

Air-Entraining Admixture: ASTM C 260/C 260M.

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

Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.

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

CURING MATERIALS

Absorptive Cover: AASHTO M 182,

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

Water: Potable.

RELATED MATERIALS

Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

CONCRETE MIXTURES

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

Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

Fly Ash or Pozzolan: 25 percent.
Slag Cement: 50 percent.
Combined Fly Ash or Pozzolan, and Slag Cement: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

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

Air Content: 6 percent plus or minus 1-1/2 percent.

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

Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

Concrete Mixtures: Normal-weight concrete.

Compressive Strength (28 Days): 4000 psi
Maximum W/C Ratio at Point of Placement: 0.45
Slump Limit: 4 inchesplus or minus 1 inch.

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

PART 3 - EXECUTION

EXAMINATION
Proof-roll prepared subbase surface below areas to be paved to identify soft pockets and areas of excess yielding.

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

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

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

STEEL REINFORCEMENT INSTALLATION
Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

JOINTS
General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated. Joints shall be spaced at intervals no greater than 12 feet.

Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness to match jointing of existing adjacent concrete paving

Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes.

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

Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

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

Screed paving surface with a straightedge and strike off.
Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

FLOAT FINISHING

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

Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.

Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

Slip-Resistive Aggregate Finish: Before final floating, spread slip-resistive aggregate finish on paving surface according to manufacturer's written instructions.

Cure concrete with curing compound recommended by slip-resistive aggregate manufacturer. Apply curing compound immediately after final finishing.

After curing, lightly work surface with a steel-wire brush or abrasive stone and water to expose nonslip aggregate.

CONCRETE PROTECTION AND CURING

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

Comply with ACI 306.1 for cold-weather protection.

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

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

Curing Methods: Cure concrete by moisture-retaining-cover curing

PAVING TOLERANCES

Comply with tolerances in ACI 117 and as follows:

Elevation: 3/4 inch.

Thickness: Plus 3/8 inch, minus 1/4 inch.

Surface: Gap below 10-feet-long; unleveled straightedge not to exceed 1/2 inch.

Joint Spacing: 3 inches.

Contraction Joint Depth: Plus 1/4 inch, no minus.

Joint Width: Plus 1/8 inch, no minus.

REPAIR AND PROTECTION

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

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

Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

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SECTION 32 17 23
PAVEMENT MARKINGS
BASED ON DFD MASTER SPECIFICATION DATED 09/01/2015

PART 1 - GENERAL

SCOPE

The work under this section consists of providing all work, materials, labor, equipment, and supervision necessary to provide and install pavement markings as provided for in these specifications and on the drawings. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Submittals

PART 2 - MATERIALS
- Pavement Markings

PART 3 - EXECUTION
- Pavement Markings

RELATED WORK

Applicable provisions of Division 01 govern work under this Section.

Related Work Specified Elsewhere:
Section 30 05 00 – Common Work Results For All Exterior Improvements
Section 32 12 16.13 – Asphalt Paving
Section 32 13 13 SF – Concrete Paving

SUBMITTALS

Submit the manufacturer specifications for each pavement marking. The submittal for each material shall include the following at a minimum:

- Pavement Marking Material and Manufacturer
- Color and Batch Number
- Date Manufactured (Material more than one year old will not be accepted)
- Manufacturer Name and Address.

PART 2 - MATERIALS

PAVEMENT MARKINGS

Furnish epoxy pavement markings conforming to WisDOT Section 646.2 as specified in the drawings.

PART 3 - EXECUTION

PAVEMENT MARKINGS

Prepare surface to receive markings and install them in accordance with WisDOT Section 646.3.

Apply pavement markings at the locations and to the dimensions and colors as shown on the drawings. If not otherwise specified, marking lines shall be yellow and have a minimum width of 4 inches.

Apply pavement markings at a rate per the manufacturers recommended application rate based on the temperature and surface material.

END OF SECTION

SECTION 32 91 13
SOIL PREPARATION

Based On DFD Master Specification Dated 02/17/2016

PART 1 - GENERAL

SCOPE

The work under this section shall consist of providing all work, materials, labor, equipment and supervision necessary to provide and prepare soil for seeding, sodding, and landscape planting. Included are the following topics:

PART 1 - GENERAL
- Scope
- References
- Submittals
- Quality Assurance

PART 2 - MATERIALS
- Topsoil
- Organic Soil Amendments
- Fertilizer
- Lime

PART 3 - EXECUTION
- Subgrade Soil Preparation
- Placing Topsoil
- Organic Soil Amendments and pH Adjustment
- Fertilizer

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

Section 32 92 18 – Seeding

REFERENCE STANDARDS

WISDOT SSHSC	Standard Specifications for Highway and Structure Construction
Section 625.2	Standard Specifications for Highway and Structure Construction
Section 629.3.1	Standard Specifications for Highway and Structure Construction
S100 Compost	Wisconsin Department of Natural Resources (DNR) Specification
ASTM D5268-07	Standard Specification for Topsoil Used for Landscaping
USDA Agricultural Handbook No. 60	Diagnosis and Improvement of Saline and Alkali Soils

SUBMITTALS

Provide product data, including applicable analytical data, for soil amendments including:
- Organic Compost
- Fertilizer

Provide copies of all quality assurance testing reports.

Material Test Reports: For standardized ASTM D 5268 topsoil existing native surface topsoil and imported or manufactured topsoil

QUALITY ASSURANCE

None required

PART 2 - PRODUCTS

TOPSOIL

Clean salvaged or imported material capable of passing the 1" sieve and meeting the requirements of Section 625.2(1) of the Standard Specifications for Highway Construction. The material shall be free of rocks, gravel, wood, debris, and of noxious weeds and their seeds.

Naturally fertile, agricultural soil, capable of sustaining vigorous growth, of uniform composition throughout, without admixtures of subsoil, free of clay, stones larger than 1" inch diameter, roots, trash and debris of any kind, supplied by Contractor at his/her expense, and subject to approval by the Architect/Engineer and Construction Representative.

ORGANIC SOIL AMENDMENTS

Organic Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve.
Organic Compost: Compost meeting Wisconsin DNR S100 Compost Specification.

FERTILIZER

All fertilizers shall be delivered fully labeled according to applicable regulations, bearing name, trade name or trademark of producer, along with producer's warranty. Application amounts of fertilizer and lime will be governed by the recommendations of the soil test.

Fertilizer: Granular, non-burning product composed of not less than fifty (50) percent organic slow-acting, guaranteed analysis professional fertilizer. Commercial fertilizer shall conform to Wisconsin State Statutes, Section 94.64, and meet the standards of the Wisconsin Department of Agriculture as to registration and labeling. Fertilizer shall be specified in the contract documents as to composition, but is subject to revision to suit project site conditions.

LIME

Lime material shall meet the requirements of Section 629.2.2 of the Standard Specifications for Highway Construction.

PART 3 - EXECUTION

SUBGRADE SOIL INSPECTION

Examine the sub-grade condition and that all drainage requirements have been met. Remove all debris and unsuitable material present.

SUBGRADE SOIL PREPARATION

Remove or mow all vegetation to a height 3". Remove all rocks, debris, and litter that will prevent compliance with topsoil and seeding specifications. Final grade area to within 2" of subgrade elevations. Till or disc the subsoil to a depth of 2"-4" to allow aeration. Areas shall be graded to a smooth uniform surface plane with loose, uniformly fine texture. All areas shall be rolled and raked to remove ridges and fill depressions and ready for final topsoil or planting mixture application. Areas shall be restored if eroded or otherwise disturbed after grading.

PLACING TOPSOIL

Place topsoil to achieve final grades indicated on the Drawings, allowing for settlement. Place to the depth shown on the Drawings. If no depth is shown provide a minimum of 6" of topsoil.

If topsoil depths are greater than 6" then the topsoil shall be installed in lifts. Moisten the soil surface between lifts at a rate of two gallons of water per square foot. Allow water to thoroughly percolate through and settle and dry before rolling and placing the next lift.

Place and spread the specified topsoil to the correct depths adjusting for the difference between seed, sod or planting bed finished grade.

Do not apply topsoil to saturated or frozen subgrades.

ORGANIC SOIL AMENDMENTS AND pH ADJUSTMENT

Provide lime or other organic soil amendments as recommended soil analysis. If topsoil has been determined acceptable by a soil test, no amendments are needed.

Uniformly apply lime and organic soil amendments, and incorporate into the top 4”-6” of soil by tilling or discing.

FERTILIZER

Fertilizer shall be applied in accordance with the requirements of Section 629.3.1 of the Standard Specifications for Highway Construction.

END OF SECTION

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SECTION 32 92 19
SEEDING
Based On DFD Master Specification Dated 07/26/2017

PART 1 - G E N E R A L

SCOPE

The work under this section shall consist of providing all work, materials, labor, equipment and supervision necessary to complete seeding, mulching and maintenance as indicated on the drawings. Included are the following topics:

PART 1 - GENERAL
- Scope
- Related Work
- Submittals
- Delivery, Storage and Handling
- Planting Season
- Guarantee

PART 2 - MATERIALS
- Grass Seed
- Grass Seed Mix
- Water
- Mulch

PART 3 - EXECUTION
- Preparation
- Sowing
- Mulching
- Cleaning and Repair
- Maintenance Watering
- Mowing
- Acceptance

RELATED WORK

Applicable provisions of Division 1 govern work under this Section.

31 25 00 - Erosion Control
32 91 19 – Soil Preparation

REFERENCE DOCUMENTS

WISDOT SSHSC	Standard Specifications for Highway and Structure Construction
Section 630.2.1	Standard Specifications for Highway and Structure Construction.
Section 630.3.3	Standard Specifications for Highway and Structure Construction
Section 627.3	Standard Specifications for Highway and Structure Construction.
AOSA	Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances

SUBMITTALS

Provide seed samples and data showing seed mix composition and a guarantee of germination.

Provide seed mixture.

Provide information on method of sowing seed.

DELIVERY, STORAGE AND HANDLING

Seed shall be delivered to the site in its original, unopened container, labeled as to weight, analysis, and manufacturer. Store any seed delivered prior to use in a manner safe from damage from heat, moisture, rodents, or other causes. Any seed damaged after acceptance shall be replaced by the Contractor.

PLANTING SEASON

The regular seeding season is considered April 1-June 15 and September 1-October 15.

GUARANTEE

Guarantee the germination of seed installed during the regular seeding season.

PART 2 - PRODUCTS

GRASS SEED

Grass seed shall meet the requirements of Section 630.2.1 of Standards Specifications for Highway Construction, as specified below.

GRASS SEED MIX

Seed Mix No. 40, as defined in Section 630.2.1.5.1.1.2 of Standard Specifications for Highway Construction**.**

Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances

Full Sun:
- 70 percent Kentucky Bluegrass (Poa pratensis), a minimum of three cultivars
- 15 percent Perennial Ryegrass (Lolium perenne)
- 15 percent Fine Fescue(Fescue variety)].

Sun and Partial Shade: Proportioned by weight as follows:
- 50 percent Kentucky Bluegrass (Poa pratensis).
- 30 percent Chewings Red Fescue (Festuca rubra variety).
- 10 percent Perennial Ryegrass (Lolium perenne).
- 10 percent Redtop (Agrostis alba)].

Shade: Proportioned by weight as follows:
- 50 percent Chewings Red Fescue (Festuca rubra variety).
- 35 percent Rough Bluegrass (Poa trivialis).
- 15 percent Redtop (Agrostis alba)].

WATER

Water free of wastewater effluent or other hazardous chemicals.

MULCH

Clean straw or hay that is well-seasoned, and free of rot, mildew and the seeds of noxious weeds.

PART 3 - EXECUTION

PREPARATION

Prepare area in accordance with Section 32 91 19 – Soil Preparation.

No seeding shall occur on frozen ground or at temperatures lower than 32^{o} F (0^{o} C).

SOWING

Sow seed using either Method A or Method B as defined in Section 630.3.3 of Standard Specifications for Highway Construction. Unless otherwise noted, sow seed at a rate of 2# (dry seed weight)/1000 square feet.

MULCHING

Place and anchor mulch using the methods outlined in Section 627.3 of Standard Specifications for Highway Construction.

CLEANING AND REPAIR

Waste and excess material from the seeding operation shall be promptly removed. Adjacent paved areas are to be cleaned, and any damage to existing adjacent turf areas shall be repaired.

MAINTENANCE WATERING

Seeded areas are to be watered daily to maintain adequate surface soil moisture for proper seed germination. Watering shall continue for not less than 30 days following seeding. Thereafter, apply 1/2" (1.3 cm) of water twice weekly until final acceptance.

MOWING

Cool season grasses, such as bluegrass, tall fescue, perennial ryegrass, etc. shall be mown to a height of 2-1/2" (6.4 cm) in spring and fall, and no less than 3" (7.6 cm) from June through September. These heights are to be maintained through repeat mowings as needed until final acceptance.

No more than 40% of grass leaf shall be removed during any single mowing operation.
The mowing operation is to include trimming around obstacles and the raking of excess grass clippings.
Weed eaters shall not be used around trees.

ACCEPTANCE

Inspection to determine acceptance of seeded areas will be made by the Architect/Engineer upon Contractor's request after a maintenance period of at least 45 days after sowing. Allow a minimum of 5 working days' notice before inspection date. Seeded areas will be acceptable provided all requirements, including maintenance, watering and mowing have been met and a healthy, uniform, close stand of the specified grass is established. Bare areas greater than 6" square will not be accepted.

END OF SECTION

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