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SPECIFICATIONS

FOR

SANI-CLEAN

PORTLAND, MAINE

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JULY 1, 2005

William E. Whited, Inc.
Architecture/Engineering/Interiors

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SECTION 01100 - SUMMARY

PART 1 - GENERAL

WORK COVERED BY CONTRACT DOCUMENTS

Project Identification:

PROJECT INFORMATION

Project Location:

Owner:

Architect Identification: The Contract Documents, dated _____, 2005, were prepared for the Project by William E. Whited, Inc., 1321 Washington Ave., Portland, Maine 04103.

Project will be constructed under a general construction contract.

SPECIFICATION FORMATS AND CONVENTIONS

Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

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:

Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

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.

END OF SECTION 01100

SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

SUMMARY

This Section specifies 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.

Correlate line items in the Schedule of Values with other required administrative forms and schedules, including Application for Payment forms with Continuation Sheets.

Submit the Schedule of Values to Architect at earliest possible date but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.

Format and Content: Use the 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.

Identification: Include the following Project identification on the Schedule of Values:

Project name and location.

Name of Architect.

Contractor's name and address.

Date of submittal.

Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

Related Specification Section or Division.

Description of the Work.

Name of subcontractor.

Name of manufacturer or fabricator.

Name of supplier.

Change Orders (numbers) that affect value.

Dollar value.

Percentage of the Contract Sum to nearest one percent, adjusted to total 100 percent.

Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.

Round amounts to nearest whole dollar; total shall equal the Contract Sum.

Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.

Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

APPLICATIONS FOR PAYMENT

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

Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.

When an application shows completion of an item, submit final or full waivers.

Owner reserves the right to designate which entities involved in the Work must submit waivers.

Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.

Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

- List of subcontractors.
- Schedule of Values.
- Contractor's Construction Schedule (preliminary if not final).
- List of Contractor's staff assignments.
- 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.
- Data needed to acquire Owner's insurance.

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

Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

Final Payment Application: 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, "Contractor's Affidavit of Payment of Debts and Claims."
- AIA Document G706A, "Contractor's Affidavit of Release of Liens."
- AIA Document G707, "Consent of Surety to Final Payment."
- Evidence that claims have been settled.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01290

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

SUMMARY

This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

See Division 1 Section "Quality Requirements" for submitting test and inspection reports and Delegated-Design Submittals.

See Division 1 Section "Closeout Procedures" for submitting warranties, project record documents, and operation and maintenance manuals.

DEFINITIONS

Action Submittals: Written and graphic information that requires Architect's responsive action.

Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

SUBMITTAL PROCEDURES

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.

Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal.

Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

If intermediate submittal is necessary, process it in same manner as initial submittal.

Allow 15 days for processing each resubmittal.

No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.

Identification: Place a permanent label or title block on each submittal for identification.

Indicate name of firm or entity that prepared each submittal on label or title block.
Provide a space approximately 4 by 5 inches (100 by 125 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
Include the following information on label for processing and recording action taken:

Project name.
Date.
Name and address of Architect.
Name and address of Contractor.
Name and address of subcontractor.
Name and address of supplier.
Name of manufacturer.
Unique identifier, including revision number.
Number and title of appropriate Specification Section.
Drawing number and detail references, as appropriate.
Other necessary identification.

Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.

Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals without review if received from sources other than Contractor.

Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.

Transmittal Form: Use AIA Document G810 or CSI Form 12.1A.

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.

Use for Construction: Use only final submittals with mark indicating action taken by Architect in connection with construction.

PART 2 - PRODUCTS

ACTION SUBMITTALS

General: Prepare and submit Action Submittals required by individual Specification Sections.

Number of Copies: Submit at least three (3) copies of each submittal, unless otherwise indicated. Architect will keep two (2) copies and return the remainder to Contractor. Mark up and retain one returned copy as a Project Record Document.

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 printed data are not suitable 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 written recommendations.

Manufacturer's product specifications.

Manufacturer's installation instructions.

Manufacturer's catalog cuts.

Wiring diagrams showing factory-installed wiring.

Printed performance curves.

Operational range diagrams.

Compliance with recognized trade association standards.

Compliance with recognized testing agency standards.

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: Include the following information, as applicable:

Dimensions.

Identification of products.

Fabrication and installation drawings.

Roughing-in and setting diagrams.

Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.

Shopwork manufacturing instructions.

Templates and patterns.

Schedules.

Notation of coordination requirements.

Notation of dimensions established by field measurement.

Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).

Coordination Drawings: Comply with requirements in Division 1 Section "Project Management and Coordination."

Samples: Prepare physical units of materials or products, including the following:

Comply with requirements in Division 1 Section "Quality Requirements" for mockups.

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.

Submit one (1) full set 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.

Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

Submit one set of Samples. Architect will review and return sample to Contractor.

Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side.

Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.

Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location.

Delegated-Design Submittal: Comply with requirements in Division 1 Section "Quality Requirements."

Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."

Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."

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.

INFORMATIONAL SUBMITTALS

General: Prepare and submit Informational Submittals required by other Specification Sections.

Number of Copies: Submit two (2) copies of each submittal, unless otherwise indicated. Architect will not return copies.

Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."

Contractor's Construction Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation."

Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.

Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.

Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements in Division 1 Section "Closeout Procedures."

Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.

Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

PART 3 - EXECUTION

CONTRACTOR'S REVIEW

Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, 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'S ACTION

General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

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

Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

SUMMARY

This Section includes administrative and procedural requirements for quality assurance and quality control.

Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.

Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

See Divisions 2 through 16 Sections for specific test and inspection requirements.

DEFINITIONS

Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.

Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.

Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

DELEGATED DESIGN

Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

SUBMITTALS

Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

QUALITY ASSURANCE

Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

QUALITY CONTROL

Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.

Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
Do not perform any duties of Contractor.

Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

Access to the Work.
Incidental labor and facilities necessary to facilitate tests and inspections.
Adequate quantities of representative samples of materials that require testing and inspecting.
Assist agency in obtaining samples.
Facilities for storage and field-curing of test samples.

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

Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS

PART 3 - EXECUTION

REPAIR AND PROTECTION

General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.

Protect construction exposed by or for quality-control service activities.

Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

SECTION 01420 - REFERENCES

PART 1 - GENERAL

DEFINITIONS

General: Basic Contract definitions are included in the Conditions of the Contract.

"Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

"Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."

"Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

"Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

"Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

"Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

"Provide": Furnish and install, complete and ready for the intended use.

"Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

"Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five (5) previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

"Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

INDUSTRY STANDARDS

Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.

Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.

Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list:

ADAAG	Americans with Disabilities Act (ADA)
CFR	Code of Federal Regulations
FS	Federal Specification

ABBREVIATIONS AND ACRONYMS

Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

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

AA	Aluminum Association, Inc. (The)
AAMA	American Architectural Manufacturers Association

1	AAN	American Association of Nurserymen (See ANLA)	1
2			2
3	ACI	American Concrete Institute/ACI International	3
4			4
5	AFPA	American Forest & Paper Association (See AF&PA)	5
6			6
7	AF&PA	American Forest & Paper Association	7
8			8
9	AGA	American Gas Association	9
10			10
11	AGC	Associated General Contractors of America (The)	11
12			12
13	AHA	American Hardboard Association	13
14			14
15	AHAM	Association of Home Appliance Manufacturers	15
16			16
17	AI	Asphalt Institute	17
18			18
19	AIA	American Institute of Architects (The)	19
20			20
21	AISC	American Institute of Steel Construction	21
22			22
23	AISI	American Iron and Steel Institute	23
24			24
25	AITC	American Institute of Timber Construction	25
26			26
27	ALA	American Laminators Association (See LMA)	27
28			28
29	ALSC	American Lumber Standard Committee	29
30			30
31	ANLA	American Nursery & Landscape Association	31
32		(Formerly: AAN - American Association of Nurserymen)	32
33			33
34	ANSI	American National Standards Institute	34
35			35
36	APA	APA - The Engineered Wood Association	36
37			37
38	APA	Architectural Precast Association	38
39			39
40	ASCE	American Society of Civil Engineers	40
41			41
42	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers	42
43			43
44	ASME	ASME International	44
45		(The American Society of Mechanical Engineers International)	45
46			46
47	ASSE	American Society of Sanitary Engineering	47
48			48
49	ASTM	American Society for Testing and Materials	49
50			50
51	AWI	Architectural Woodwork Institute	51
52			52
53	AWPA	American Wood-Preservers' Association	53
54			54
55			55
56			56

**SANI-CLEAN
PORTLAND, ME**

1			1
2	AWS	American Welding Society	2
3			3
4	AWWA	American Water Works Association	4
5			5
6	BHMA	Builders Hardware Manufacturers Association	6
7			7
8	BIA	Brick Industry Association (The)	8
9			9
10	CDA	Copper Development Association Inc.	10
11			11
12	CFFA	Chemical Fabrics & Film Association, Inc.	12
13			13
14	CISCA	Ceilings & Interior Systems Construction Association	14
15			15
16	CISPI	Cast Iron Soil Pipe Institute	16
17			17
18	CPA	Composite Panel Association	18
19		(Formerly: National Particleboard Association)	19
20			20
21	CPPA	Corrugated Polyethylene Pipe Association	21
22			22
23	CRI	Carpet & Rug Institute (The)	23
24			24
25	CRSI	Concrete Reinforcing Steel Institute	25
26			26
27	CSI	Construction Specifications Institute (The)	27
28			28
29	CSSB	Cedar Shake & Shingle Bureau	29
30			30
31	DHI	Door and Hardware Institute	31
32			32
33	EIA/TIA	Electronic Industries Alliance/Telecommunications Industry Association	33
34			34
35	EIMA	EIFS Industry Members Association	35
36			36
37	EJMA	Expansion Joint Manufacturers Association, Inc.	37
38			38
39	FM	Factory Mutual System (See FMG)	39
40			40
41	GA	Gypsum Association	41
42			42
43	GANA	Glass Association of North America	43
44		(Formerly: FGMA - Flat Glass Marketing Association)	44
45			45
46	GRI	Geosynthetic Research Institute	46
47			47
48	GTA	Glass Tempering Division of Glass Association of North America (See GANA)	48
49			49
50	HI	Hydraulic Institute	50
51			51
52	HI	Hydronics Institute	52
53			53
54			54
55			55
56			56

**SANI-CLEAN
PORTLAND, ME**

1	HMMA	Hollow Metal Manufacturers Association (See NAAMM)	1
2			2
3	HPVA	Hardwood Plywood & Veneer Association	3
4			4
5	ICEA	Insulated Cable Engineers Association, Inc.	5
6			6
7	IEC	International Electrotechnical Commission	7
8			8
9	IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)	9
10			10
11	IESNA	Illuminating Engineering Society of North America	11
12			12
13	IGCC	Insulating Glass Certification Council	13
14			14
15	KCMA	Kitchen Cabinet Manufacturers Association	15
16			16
17	LGSI	Light Gage Structural Institute	17
18			18
19	LMA	Laminating Materials Association	19
20		(Formerly: ALA - American Laminators Association)	20
21			21
22	LPI	Lightning Protection Institute	22
23			23
24	LSGA	Laminated Safety Glass Association (See GANA)	24
25			25
26	MBMA	Metal Building Manufacturers Association	26
27			27
28	MCA	Metal Construction Association	28
29			29
30	MFMA	Maple Flooring Manufacturers Association	30
31			31
32	MFMA	Metal Framing Manufacturers Association	32
33			33
34	MIA	Marble Institute of America	34
35			35
36	ML/SFA	Metal Lath/Steel Framing Association (See SSMA)	36
37			37
38	MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.	38
39			39
40	NAAMM	National Association of Architectural Metal Manufacturers	40
41			41
42	NAAMM	North American Association of Mirror Manufacturers (See GANA)	42
43			43
44	NACE	NACE International	44
45		(National Association of Corrosion Engineers International)	45
46			46
47	NAIMA	North American Insulation Manufacturers Association (The)	47
48			48
49	NBGQA	National Building Granite Quarries Association, Inc.	49
50			50
51	NCMA	National Concrete Masonry Association	51
52			52
53	NCPI	National Clay Pipe Institute	53
54			54
55			55
56			56

1			1
2	NCTA	National Cable Television Association	2
3			3
4	NECA	National Electrical Contractors Association	4
5			5
6	NeLMA	Northeastern Lumber Manufacturers' Association	6
7			7
8	NEMA	National Electrical Manufacturers Association	8
9			9
10	NFPA	National Fire Protection Association	10
11			11
12	NFRC	National Fenestration Rating Council	12
13			13
14	NGA	National Glass Association	14
15			15
16	NHLA	National Hardwood Lumber Association	16
17			17
18	NLGA	National Lumber Grades Authority	18
19			19
20	NOFMA	National Oak Flooring Manufacturers Association	20
21			21
22	NPA	National Particleboard Association (See CPA)	22
23			23
24	NRCA	National Roofing Contractors Association	24
25			25
26	NRMCA	National Ready Mixed Concrete Association	26
27			27
28	NSA	National Stone Association	28
29			29
30	NSF	NSF International	30
31		(National Sanitation Foundation International)	31
32			32
33	NTMA	National Terrazzo and Mosaic Association, Inc.	33
34			34
35	NWWDA	National Wood Window and Door Association (See WDMA)	35
36			36
37	PCI	Precast/Prestressed Concrete Institute	37
38			38
39	PDI	Plumbing & Drainage Institute	39
40			40
41	PGI	PVC Geomembrane Institute	41
42			42
43	RCSC	Research Council on Structural Connections	43
44			44
45	RFCI	Resilient Floor Covering Institute	45
46			46
47	RIS	Redwood Inspection Service	47
48			48
49	RMA	Rubber Manufacturers Association	49
50			50
51	SAE	SAE International	51
52			52
53	SDI	Steel Deck Institute	53
54			54
55			55
56			56

1			1
2	SDI	Steel Door Institute	2
3			3
4	SGCC	Safety Glazing Certification Council	4
5			5
6	SIGMA	Sealed Insulating Glass Manufacturers Association	6
7			7
8	SJI	Steel Joist Institute	8
9			9
10	SMA	Screen Manufacturers Association	10
11			11
12	SMACNA	Sheet Metal and Air Conditioning Contractors' National Association	12
13			13
14	SPIB	Southern Pine Inspection Bureau (The)	14
15			15
16	SPRI	SPRI (Single Ply Roofing Institute)	16
17			17
18	SSMA	Steel Stud Manufacturers Association	18
19		(Formerly: ML/SFA - Metal Lath/Steel Framing Association)	19
20			20
21	SSPC	SSPC: The Society for Protective Coatings	21
22			22
23	STI	Steel Tank Institute	23
24			24
25	SWI	Steel Window Institute	25
26			26
27	SWRI	Sealant, Waterproofing, and Restoration Institute	27
28			28
29	TCA	Tile Council of America, Inc.	29
30			30
31	TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance	31
32			32
33	TPI	Truss Plate Institute	33
34			34
35	UL	Underwriters Laboratories Inc.	35
36			36
37	UNI	Uni-Bell PVC Pipe Association	37
38			38
39	WCLIB	West Coast Lumber Inspection Bureau	39
40			40
41	WDMA	Window & Door Manufacturers Association	41
42		(Formerly: NWWDA - National Wood Window and Door Association)	42
43			43
44	WIC	Woodwork Institute of California	44
45			45
46	WMPMA	Wood Moulding & Millwork Producers Association	46
47			47
48	WWPA	Western Wood Products Association	48
49			49
50			50
51			51
52			52
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1	Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list:	1
2		2
3		3
4	BOCA BOCA International, Inc.	4
5		5
6	CABO Council of American Building Officials (See ICC)	6
7		7
8	IAPMO International Association of Plumbing and Mechanical Officials (The)	8
9		9
10	ICBO International Conference of Building Officials	10
11		11
12	ICC International Code Council	12
13	(Formerly: CABO - Council of American Building Officials)	13
14		14
15	SBCCI Southern Building Code Congress International, Inc.	15
16		16
17		17
18	<u>PART 2 - PRODUCTS</u>	18
19		19
20		20
21	<u>PART 3 - EXECUTION</u>	21
22		22
23		23
24	END OF SECTION 01420	24
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SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

SUMMARY

This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

- Construction layout.
- Field engineering and surveying.
- General installation of products.
- Progress cleaning.
- Starting and adjusting.
- Protection of installed construction.
- Correction of the Work.

See Division 1 Section "Closeout Procedures" for submitting final Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

SUBMITTALS

Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

PART 2 - PRODUCTS

PART 3 - EXECUTION

EXAMINATION

Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

Furnish location data for work related to Project that must be performed by public utilities serving Project site.

Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

- Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

PREPARATION

Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

Notify Owner not less than two (2) days in advance of proposed utility interruptions.
Do not proceed with utility interruptions without Owner's written permission.

Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

CONSTRUCTION LAYOUT

Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

General: Engage a land surveyor to lay out the Work using accepted surveying practices.

Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.

Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.

Inform installers of lines and levels to which they must comply.

Check the location, level and plumb, of every major element as the Work progresses.

Notify Architect when deviations from required lines and levels exceed allowable tolerances.

Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

FIELD ENGINEERING

Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

Certified Survey: On completion of foundation walls and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

INSTALLATION

General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

Make vertical work plumb and make horizontal work level.

Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

Allow for building movement, including thermal expansion and contraction.

Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

PROGRESS CLEANING

General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).

Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

Site: Maintain Project site free of waste materials and debris.

Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

Remove liquid spills promptly.

Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

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

Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

STARTING AND ADJUSTING

Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

PROTECTION OF INSTALLED CONSTRUCTION

Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

Comply with manufacturer's written instructions for temperature and relative humidity.

CORRECTION OF THE WORK

Repair or remove and replace defective construction. Restore damaged substrates and finishes.

Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

Restore permanent facilities used during construction to their specified condition.

Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01700

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

SUMMARY

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

- Inspection procedures.
- Project Record Documents.
- Operation and maintenance manuals.
- Warranties.
- Instruction of Owner's personnel.
- Final cleaning.

See Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.

See Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for products of those Sections.

SUBSTANTIAL COMPLETION

Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

- Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
- Advise Owner of pending insurance changeover requirements.
- Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
- Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
- Prepare and submit Project Record Documents, operation and maintenance manuals, Final Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
- Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
- Complete startup testing of systems.
- Submit test/adjust/balance records.
- Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
- Advise Owner of changeover in heat and other utilities.
- Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- Complete final cleaning requirements, including touchup painting.
- Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

Inspection: Submit a written request for inspection for Substantial Completion. 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.

Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

Results of completed inspection will form the basis of requirements for Final Completion.

FINAL COMPLETION

Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

Submit a final Application for Payment according to Division 1 Section "Payment Procedures."

Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

Submit evidence of final, continuing insurance coverage complying with insurance requirements.

Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

Inspection: Submit a written request for final inspection for acceptance. 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.

Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

LIST OF INCOMPLETE ITEMS (PUNCH LIST)

Preparation: Submit three (3) copies 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 and proceeding from lowest floor to highest floor.

Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

PROJECT RECORD DOCUMENTS

General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.

Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

Give particular attention to information on concealed elements that cannot be readily identified and recorded later.

Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.

Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

Note related Change Orders and Record Drawings, where applicable.

Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

OPERATION AND MAINTENANCE MANUALS

Assemble a complete set of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:

Operation Data: Include emergency instructions and procedures, system and equipment descriptions, operating procedures, and sequence of operations.

Maintenance Data: Include manufacturer's information, list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds.

Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

WARRANTIES

Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

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

Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.

Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

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

DEMONSTRATION AND TRAINING

Instruction: Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

Provide instructors experienced in operation and maintenance procedures.

Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.

Schedule training with Owner with at least seven (7) days' advance notice.

Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.

FINAL CLEANING

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

Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. 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 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.

Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

Remove tools, construction equipment, machinery, and surplus material from Project site.

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.

Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

Sweep concrete floors broom-clean in unoccupied spaces.

Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.

Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

Remove labels that are not permanent.

Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

Replace parts subject to unusual operating conditions.

Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

Leave Project clean and ready for occupancy.

Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

SUMMARY

This Section includes administrative and procedural requirements for Project Record Documents, including the following:

- Record Drawings.
- Record Specifications.
- Record Product Data.

See Division 1 Section "Closeout Procedures" for operation and maintenance manual requirements.

See Divisions 2 through 16 Sections for specific requirements for Project Record Documents of products in those Sections.

PART 2 - PRODUCTS

RECORD DRAWINGS

Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare marked-up Record Prints.

Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.

Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.

RECORD SPECIFICATIONS

Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

Record name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

Note related Change Orders, Record Drawings, and Produce Data where applicable.

RECORD PRODUCT DATA

Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

Note related Change Orders, Record Drawings, and Produce Data where applicable.

MISCELLANEOUS RECORD SUBMITTALS

Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

RECORDING AND MAINTENANCE

Recording: Maintain one copy of each submittal during construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until end of Project.

Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 01781

SECTION 02230 - SITE CLEARING

PART 1 - GENERAL

SUMMARY

This Section includes the following:

- Protecting existing trees and vegetation to remain.
- Removing trees and other vegetation.
- Clearing and grubbing.
- Topsoil stripping.
- Removing above-grade site improvements.
- Disconnecting, capping or sealing, and relocating site utilities.

PROJECT CONDITIONS

Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS

PART 3 - EXECUTION

PREPARATION

Call Digsafe before beginning site clearing and excavation work.

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

Locate and clearly flag trees and vegetation to remain or to be relocated.

Protect existing site improvements to remain from damage during construction.

Restore damaged improvements to their original condition, as acceptable to Owner.

TREE PROTECTION

Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.

Do not excavate within drip line of trees, unless otherwise indicated.

UTILITIES

Locate, identify, disconnect, and seal or cap off utilities indicated to be relocated.

Do not interrupt utilities serving facilities occupied by Owner or others unless permitted. Arrange to provide temporary utility services.

Excavate for and remove underground utilities indicated to be relocated.

CLEARING AND GRUBBING

Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.

Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

Place fill material in horizontal layers not exceeding 8-inch (200-mm) loose depth, and compact each layer to a density equal to adjacent original ground.

TOPSOIL STRIPPING

Remove sod and grass before stripping topsoil.

Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

Stockpile excess topsoil on site per Owner's directions.

SITE IMPROVEMENTS

Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

DISPOSAL

Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 02230

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

SUMMARY

This Section includes the following:

- Preparing subgrades.
- Excavating and backfilling.
- Drainage course for slabs-on-grade.
- Subbase course for concrete walks and pavements .
- Base course for asphalt paving.

DEFINITIONS

Backfill: Soil materials used to fill an excavation.

Base Course: Layer placed between the subbase course and asphalt paving.

Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

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

Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

Excavation: Removal of material encountered above subgrade elevations.

Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

Fill: Soil materials used to raise existing grades.

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

Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.

Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

PROJECT CONDITIONS

Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

Use of Explosives: Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction. The Contractor is responsible for obtaining a blasting permit from the Town of Topsham and for following all application codes and regulations.

Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

PART 2 - PRODUCTS

SOIL MATERIALS

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

Subbase: MDOT Standard Specification Aggregate Subbase 703.06, Type D.

Base: MDOT Standard Specification Aggregate Base 703.06, Type C.

Unsatisfactory Soils: Clay, silt, organic peat, and topsoil.

Backfill and Fill: Satisfactory soil materials.

Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; MDOT 703.06, Type D.

Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; MDOT 703.06, Type C.

Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; MDOT Type E; except with 100 percent passing a 1-inch (25-mm) sieve and not more than 8 percent passing a No. 200 (0.075-mm) sieve.

Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; with 100 percent passing a 1-1/2-inch (38-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

Detectable Warning Tape: Polyethylene film warning tape encasing a metallic core, minimum 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility.

PART 3 - EXECUTION

PREPARATION

Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, freezing temperatures or frost, and other hazards created by earthwork operations. Provide protective insulating materials as necessary, in accordance with the plans and authorities having jurisdiction.

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

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

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

EXCAVATION

Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.

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

Excavate for structures, pavements, and walks to indicated elevations and dimensions. Extend excavations for placing and removing concrete formwork, for installing services and other construction, and for inspections. Trim bottoms to required lines and grades to leave solid base to receive other work.

Excavate utility trenches to indicated gradients, lines, depths, and invert elevations of uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit.

Excavate trenches deeper than bottom of pipe elevation, 6 inches (150 mm) deeper in rock, 4 inches (100 mm) deeper elsewhere, to allow for bedding course. Hand excavate for bell of pipe.

Proof roll subgrades, before filling or placing aggregate courses, with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities.

Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.

Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

Stockpile borrow materials and satisfactory soil materials, without intermixing, in shaped, graded, drained, and covered stockpiles. Stockpile soil materials away from edge of excavations and outside drip line of remaining trees.

BACKFILLS AND FILLS

Utility Trench Backfill: Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.

Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit.

Place and compact final backfill of satisfactory soil material to final subgrade.

Install warning tape directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

Fill: Place and compact fill material in layers to required elevations.

Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

Compaction: Place backfill and fill materials in layers not more than 8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.

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

Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches (300 mm) of existing subgrade and each layer of backfill or fill material at 95 percent.

Under walkways, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 92 percent.

Under lawn or unpaved areas, scarify and recompact top 6 inches (150 mm) below subgrade and compact each layer of backfill or fill material at 85 percent.

Grading: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Grade lawns, walks, and unpaved subgrades to tolerances of plus or minus 1 inch (25 mm) and pavements and areas within building lines to plus or minus 1/2 inch (13 mm).

Subbase and Base Courses: Under pavements and walks, place subbase course on prepared subgrade. Place base course material over subbase. Compact to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.

Under slabs-on-grade, place drainage course on prepared subgrade. Compact to required cross sections and thickness to not less than 95 percent of maximum unit weight according to ASTM D 4254.

FIELD QUALITY CONTROL

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

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

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

PROTECTION AND DISPOSAL

Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction.

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

Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

SECTION 02620 - SUBDRAINAGE

PART 1 - GENERAL

SUMMARY

This Section includes subdrainage systems for foundations.

PART 2 - PRODUCTS

PIPING MATERIALS

Refer to various application articles in Part 3 for applications of pipe, tube, fitting, and joining materials.

DRAINAGE PIPES AND FITTINGS

Perforated, PVC Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

Open-Joint Screening: Woven geotextile filter fabric, for a minimum total weight of 3 oz./sq. yd. (0.10 kg/sq. m).

SOIL MATERIALS

Impervious Fill: Clay, gravel, and sand mixture.

Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate, Size No. 57, with 100 percent passing 1-1/2-inch (37.5-mm) sieve and not more than 5 percent passing No. 8 (2.36-mm) sieve.

GEOTEXTILE FILTER FABRICS

Woven or nonwoven geotextile filter fabric of PP or polyester fibers, or combination of both. Flow rates range from 110 to 330 gpm per sq. ft. (4480 to 13 440 L/min. per sq. m) when tested according to ASTM D 4491. Available styles are flat and sock.

PART 3 - EXECUTION

EARTHWORK

Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

SUBDRAINAGE SYSTEM APPLICATIONS

NPS 4 (DN 100) Piping:

Perforated, PVC sewer pipe and fittings for loose, bell-and-spigot joints.

FOUNDATION DRAINAGE INSTALLATION

Drainage Fill: Place supporting layer of drainage fill over compacted subgrade to compacted depth of not less than 4 inches (100 mm). After installing drainage piping, add drainage fill to width of at least 6 inches (150 mm) on side away from wall and to top of pipe to perform tests. After satisfactory testing, cover piping to width of at least 6 inches (150 mm) on side away from footing and above top of pipe to within 12 inches (300 mm) of finish grade. Place drainage fill in layers not exceeding 3 inches (75 mm) in loose depth; compact each layer placed.

Before installing drainage fill, lay flat-style geotextile filter fabric in trench and overlap trench sides. After installing drainage fill, wrap top of drainage fill with flat-style geotextile filter fabric.

Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with electrical tape.

After installing drainage fill, place one layer of flat-style geotextile filter fabric over top of drainage fill, overlapping edges at least 4 inches (100 mm).

Fill to Grade: Place native fill material over compacted drainage fill. Place material in loose-depth layers not exceeding 6 inches (150 mm). Thoroughly compact each layer. Fill to finish elevations and slope away from building.

PIPING INSTALLATION

Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.

Foundation Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 36 inches (915 mm), unless otherwise indicated.

Lay perforated pipe with perforations down.

Lay open-joint pipe spaced as indicated on Drawings or, if not indicated, with 1/4-inch (6-mm) space between ends. Cover top two-thirds of joint opening with open-joint screening material and tie with corrosion-resistant wire.

Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

Install PVC piping according to ASTM D 2321.

PIPE JOINT CONSTRUCTION

Join perforated, PVC pipe and fittings according to ASTM D 2729, with loose, bell-and-spigot joints.

FIELD QUALITY CONTROL

Testing: After installing drainage fill to top of pipe, test drain piping with water to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

CLEANING

Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 02620

SECTION 02711 - FOUNDATION DRAINAGE SYSTEMS

PART 1 - GENERAL

RELATED DOCUMENTS

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

SUMMARY

This Section includes foundation, subsoil drainage systems.

Related Sections: The following Sections contain requirements that relate to this Section:

Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

QUALITY ASSURANCE

Installer Qualifications: Engage an experienced Installer who has completed foundation drainage systems similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

COORDINATION

Coordinate foundation drainage system installation with excavating, trenching, and backfilling.

PART 2 - PRODUCTS

MANUFACTURERS

Products: Subject to compliance with requirements, provide one of the following:

PIPES AND FITTINGS

General: Include pipes, fittings, couplings, and joint materials.

Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 3034, SDR 35, bell-and-spigot ends, for gasketed joints.

Gaskets: ASTM F 477, elastomeric seal.

Perforated, Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D 2729, bell-and-spigot ends, for loose joints.

SOIL MATERIALS

Impervious Fill: Clayey gravel and sand mixture capable of compacting to dense state.

Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate, Size No. 57, with 100 percent passing 1-1/2-inch sieve and not more than 5 percent passing No. 8 sieve.

FILTER FABRIC

Filter Fabric: Manufacturer's standard nonwoven pervious geotextile fabric of polypropylene, nylon or polyester fibers, or a combination.

Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D 4759 and the referenced standard test method in parentheses:

Grab Tensile Strength (ASTM D 4632): 100 lb.

Apparent Opening Size (ASTM D 4751): #100 U.S. Standard sieve.

Permeability (ASTM D 4491): 150 gallons per minute per sq. ft.

PART 3 - EXECUTION

EXAMINATION

Examine surfaces and areas for suitable conditions where foundation drainage systems are to be installed. Do not proceed until unsatisfactory conditions have been corrected.

FOUNDATION DRAINAGE SYSTEM APPLICATIONS

Systems with 4-Inch Piping: As follows:

Perforated, polyvinyl chloride (PVC) sewer pipe and fittings for loose, bell-and-spigot joints.

PIPING INSTALLATION

Drawing plans and details indicate general location and arrangement of foundation drainage system piping.

Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing, solidly in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.

Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent and with a minimum cover of 36 inches, except where otherwise indicated.

Provide recesses in excavation bottom to receive bells of pipe bell ends. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

Apply and compact impervious fill material to raise low areas or where unsatisfactory bearing soil may occur.

Extend piping and connect to storm drainage system, of sizes and in locations indicated. Terminate piping as indicated.

PIPE JOINT CONSTRUCTION AND INSTALLATION

General: Join and install pipe and fittings as indicated and according to the following.

Polyvinyl Chloride (PVC) Pipe and Fittings: As follows:

Join ASTM D 2729 perforated, sewer pipe and fittings with loose, bell-and-spigot joints.

Install according to ASTM D 2321.

Install perforated pipe with perforations down.

SOIL MATERIAL INSTALLATION

Impervious Fill at Footings: Place impervious fill material on subgrade adjacent to bottom of footing after concrete footings have been cured and forms removed. Place and compact impervious fill to dimensions indicated but not less than 6 inches deep and 12 inches wide.

Filtering Material: Place supporting layer of filtering material over compacted subgrade where drainage pipe is to be laid to depth indicated or, if not indicated, to compacted depth of not less than 4 inches.

Drainage Fill: Place fill over drain piping after satisfactory testing and covering with filtering material. Cover piping to width of at least 6 inches on each side and above top of pipe to within 12 inches of finish grade. Place fill material in layers not exceeding 3 inches in loose depth, and compact each layer placed.

Fill to Grade: Place impervious fill material over compacted drainage fill. Place material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish elevations and slope away from building.

FIELD QUALITY CONTROL

Testing: Test drain piping with water or visually check piping to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

Place additional filtering material to depth of 4 inches around sides and top of drains after testing.

END OF SECTION 02711

SECTION 02741 - HOT-MIX ASPHALT PAVING

PART 1 - GENERAL

SUMMARY

This Section includes hot-mix asphalt paving, patching and paving overlay.

SUBMITTALS

Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

Material certificates.

QUALITY ASSURANCE

Manufacturer Qualifications: Manufacturer shall be registered with and approved by authorities having jurisdiction or the DOT of the state in which Project is located.

Regulatory Requirements: Comply with MDOT for asphalt paving work.

PROJECT CONDITIONS

Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

Tack Coat: Minimum surface temperature of 60 deg F (15.5 deg C).

Asphalt Base Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.

Asphalt Surface Course: Minimum surface temperature of 60 deg F (15.5 deg C) at time of placement.

Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4 deg C) for oil-based materials, 50 deg F (10 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

PART 2 - PRODUCTS

ASPHALT MATERIALS

Asphalt Binder: AASHTO MP 1, PG 58-28.

Tack Coat: AASHTO M 140, emulsified asphalt or AASHTO M 208, cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

AUXILIARY MATERIALS

Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, with drying time of less than 45 minutes.

Color: Yellow.

MIXES

Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction, and complying with the following requirements:

Provide mixes with a history of satisfactory performance in geographical area where Project is located.

Base Course: MDOT 703.09 B Aggregate.

Surface Course: MDOT 703.09 D Aggregate.

PART 3 - EXECUTION

SURFACE PREPARATION

Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

HOT-MIX ASPHALT PLACING

Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

Spread mix at minimum temperature of 250 deg F (121 deg C).

Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.

Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

COMPACTION

General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

Complete compaction before mix temperature cools to 185 deg F (85 deg C).

Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

INSTALLATION TOLERANCES

Thickness: Compact each course to produce the thickness indicated within the following tolerances:

Base Course: Plus or minus 1/2 inch (13 mm).

Surface Course: Plus 1/4 inch (6 mm), no minus.

Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:

Base Course: 1/4 inch (6 mm).

Surface Course: 1/8 inch (3 mm).

PAVEMENT MARKING

Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

Allow paving to age for 45 days before starting pavement marking.

Sweep and clean surface to eliminate loose material and dust.

Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).

END OF SECTION 02741

SECTION 02920 - LAWNS AND GRASSES

PART 1 - GENERAL

SUMMARY

This Section includes seeding.

DEFINITIONS

Finish Grade: Elevation of finished surface of planting soil.

Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

LAWN MAINTENANCE

Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

Mow lawn as soon as top growth is tall enough to cut. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings.

PART 2 - PRODUCTS

SEED

Seed Species: State-certified seed of grass species, as indicated on Drawings.

PART 3 - EXECUTION

LAWN PREPARATION

Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 2 inches (50 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:

Remove existing grass, vegetation, and turf. Do not mix into surface soil.

Loosen surface soil to a depth of at least of 6 inches (150 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches (100 mm) of soil. Till soil to a homogeneous mixture of fine texture.

Remove stones larger than 2 inches (50 mm) in any dimension and sticks, roots, trash, and other extraneous matter.

Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

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

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

Restore areas if eroded or otherwise disturbed after finish grading and before planting.

SATISFACTORY LAWNS

Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches (125 by 125 mm).

Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

END OF SECTION 02920

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

SUMMARY

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

See Division 2 Section "Earthwork" for drainage fill under slabs-on-grade.

SUBMITTALS

Design Mixes: For each concrete mix indicated.

Shop Drawings: Include details of steel reinforcement placement including material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports.

QUALITY ASSURANCE

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

Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.

- General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
- Formwork and form accessories.
- Steel reinforcement and supports.
- Concrete mixtures.
- Handling, placing, and constructing concrete.

PART 2 - PRODUCTS

MATERIALS

Formwork: Furnish formwork and form accessories according to ACI 301. Use metal edged forms to reduce fins and irregularities.

Steel Reinforcement:

Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

Concrete Materials:

Portland Cement: ASTM C 150, Type II.
Normal-Weight Aggregate: ASTM C 33, uniformly graded, not exceeding 1-1/2-inch (38-mm) nominal size.
Water: Complying with ASTM C 94.
Synthetic Fiber: Fibrillated or monofilament polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

Admixtures:

Air-Entraining Admixture: ASTM C 260.
Water-Reducing Admixture: ASTM C 494, Type A.
Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

Vapor Retarder: Polyolefin, ASTM E 1745, Class B, not less than 12 mils thick.

Curing Materials:

Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B; compatible with adhesive proposed for floor coverings.

CONCRETE MIXES

Comply with ACI 301 requirements for concrete mixtures.

Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory trial mix or field test data bases, as follows:

Compressive Strength (28 Days): 3000 psi (20.7 MPa).
Slump: 4 inches (100 mm).

Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 8 inches (200 mm) after adding admixture to plant- or site-verified, 2- to 3-inch (50- to 75-mm) slump.

Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 6.0 percent within a tolerance of plus 1.0 or minus 1.5 percent.

Air content of trowel-finished interior concrete floors shall not exceed 3.0 percent.

Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

CONCRETE MIXING

Ready-Mixed Concrete: Comply with ASTM C 94 and ASTM C 1116.

When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

INSTALLATION, GENERAL

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

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

Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

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

Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by Architect.

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 the concrete thickness, as follows:

Sawed Joints: Form contraction joints with soft-cut power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks. Use soft-cut dry-cut saws within one to two hours after final trowelling.

Tolerances: Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

CONCRETE PLACEMENT

Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

Consolidate concrete with mechanical vibrating equipment.

FINISHING FORMED SURFACES

Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch (6 mm) in height rubbed down or chipped off.

Apply to concrete surfaces not exposed to public view.

Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.

Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.

Do not apply rubbed finish to smooth-formed finish.

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 the surface.

Do not further disturb surfaces before starting finishing operations.

Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

Trowel Finish: Apply a hard trowel finish 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.

Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

Nonslip Broom Finish: Apply a nonslip broom 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.

CONTROL JOINTS

Soft-cut control joints in floor slabs within one to two hours after final trowel finish.

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, and follow recommendations in ACI 305R for hot-weather protection during curing.

Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions occur 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.

Cure formed and unformed concrete for at least seven days as follows:

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.

Testing Frequency: At least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.

END OF SECTION 03300

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

SUMMARY

This Section includes the following:

- Framing with dimension lumber.
- Framing with engineered wood products.
- Wood blocking, cants and nailers.
- Wood furring and grounds.
- Wood sleepers.
- Plywood backing panels.

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.
- Provide dressed lumber, S4S, unless otherwise indicated.

Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

- Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

WOOD-PRESERVATIVE-TREATED LUMBER

Preservative Treatment by Pressure Process: AWPA C2[, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX)].

- 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.

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 floor plates that are installed over concrete slabs-on-grade.

DIMENSION LUMBER FRAMING

Maximum Moisture Content: 19 percent.

Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 3 grade of any species.

Framing Other Than Non-Load-Bearing Interior Partitions: Construction or No. 2 grade and any of the following species:

Spruce-pine-fir; NeLMA.

Framing Other Than Non-Load-Bearing Interior Partitions: Any species and grade with a modulus of elasticity of at least 1,300,000 psi (8970 MPa), and an extreme fiber stress in bending of at least 850 psi (5.86 MPa) for 2-inch nominal (38-mm actual) thickness and 12-inch nominal (286-mm actual) width for single-member use.

Exposed Exterior Framing Indicated to Receive a Stained or Natural Finish: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.

Species and Grade: Spruce-pine-fir (south) No. 1 grade; NeLMA, WCLIB, or WWPA.

Species and Grade: Eastern hemlock-balsam fir or Eastern hemlock-tamarack No. 1 grade; NeLMA.

Species and Grade: Redwood No. 1 grade; RIS.

Species and Grade: Western cedars No. 1 grade; WCLIB, or WWPA.

ENGINEERED WOOD PRODUCTS

Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.

Extreme Fiber Stress in Bending, Edgewise: 2900 psi (20.0 MPa) for 12-inch nominal- (286-mm actual-) depth members.

Modulus of Elasticity, Edgewise: 1,800,000 psi (12 400 MPa).

Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units complying with material requirements of and with structural capacities established and monitored according to ASTM D 5055.

Web Material: Either oriented strand board or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1.

Structural Properties: Provide units with depths and design values not less than those indicated.

Provide units complying with APA PRI-400, factory marked with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.

Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.

Material: Product made from any combination solid lumber, wood strands, and veneers.

Thickness: 1-1/8 inches (28 mm).

Provide performance-rated product complying with APA PRR-401, rim board grade, factory marked with APA trademark indicating thickness, grade, and compliance with APA standard.

MISCELLANEOUS LUMBER

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

Blocking.

Nailers.

Furring.

For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 19 percent maximum moisture content of any species.

For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

Eastern softwoods, No. 3 Common grade; NeLMA.

PLYWOOD BACKING PANELS

Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 1/2-inch (13-mm) nominal thickness.

FASTENERS

General: Provide fasteners of size and type indicated that comply with requirements specified.

Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

Power-Driven Fasteners: NES NER-272.

Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

METAL FRAMING ANCHORS

Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:

Cleveland Steel Specialty Co.
Harlen Metal Products, Inc.
KC Metals Products, Inc.
Simpson Strong-Tie Co., Inc.
USP Structural Connectors.

Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of basis-of-design products. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

MISCELLANEOUS MATERIALS

Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

INSTALLATION

Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring nailers, blocking, and similar supports to comply with requirements for attaching other construction.

Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

Do not splice structural members between supports, unless otherwise indicated.

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

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

NES NER-272 for power-driven fasteners.
Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

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 06100

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

SUMMARY

This Section includes the following:

Standing and running trim.
Stairs and railings.
Siding.

PART 2 - PRODUCTS

MATERIALS, GENERAL

Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," for lumber and with applicable grading rules of inspection agencies certified by the American Lumber Standards Committee Board of Review.

Softwood Plywood: Comply with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood."

Preservative Treatment: Comply with NWWDA I.S. 4 for exterior finish carpentry to receive water-repellent preservative treatment.

STANDING AND RUNNING TRIM

Exterior Standing and Running Trim: Finished lumber and moldings.

Species and Grade: NeLMA B&B, eastern white pine.

Interior Standing and Running Trim: Finished lumber and moldings.

Species and Grade or Cut: C Select, eastern white pine; NELMA or B & Btr. Select or Supreme, Idaho white, lodgepole, ponderosa, or sugar pine; WWPA.

Wood Molding Patterns: Stock moldings made to patterns included in WMMPA WM 7 and graded under WMMPA WM 4.

Base: WM 753 (beaded-edge base).

Casing: WM 376 (beaded-edge casing).

Shoe Mold: Clear, kiln-dried red oak; WM 126, 1/2-by-3/4-inch (13-by-19-mm) quarter-round shoe.

Moldings for Painted Finish: P-Grade.

Shelving: 3/4-inch (19-mm) [particleboard shelving with radiused and filled front edge or boards of same species and grade indicated above for interior lumber trim for opaque finish.

STAIRS AND RAILINGS

Interior Stair Treads: 1-1/16-inch (27-mm), clear, kiln-dried, edge-glued, rift-sawn red oak stepping with half-round nosing.

Interior Railings: Clear, kiln-dried, hard maple railing stock of pattern indicated, either solid or laminated.

Balusters: Clear, kiln-dried hard maple baluster stock of pattern indicated.

Riser Sub-rail and Stringers: Clear kiln-dried hard maple stock.

MISCELLANEOUS MATERIALS

Fasteners for Exterior Finish Carpentry: Provide nails of stainless steel or noncorroding aluminum.

PART 3 - EXECUTION

PREPARATION

Condition finish carpentry to average prevailing humidity conditions in installation areas before installation, for a minimum of 24 hours.

Prime and backprime lumber for painted finish exposed on the exterior. Comply with requirements for surface preparation and application in Division 9 Section "Painting."

INSTALLATION

Install finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where required for alignment. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts.

Standing and Running Trim: Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Stagger joints in adjacent and related trim. Cope at returns and miter at corners.

Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.

END OF SECTION 06200

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

SUMMARY

This Section includes the following:

- Perimeter insulation under slabs-on-grade.
- Perimeter wall insulation (supporting backfill).
- Concealed building insulation.
- Vapor retarders.
- Sound attenuation insulation.

QUALITY ASSURANCE

Retain ASTM test method below based on product and kind of fire-resistance characteristic specified for each product in Part 2. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics and other methods indicated with product, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

PART 2 - PRODUCTS

MANUFACTURERS

In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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

FOAM-PLASTIC BOARD INSULATION

Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.60 lb/cu. ft. (26 kg/cu. m), with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:

Available Manufacturers:

- DiversiFoam Products.
- Dow Chemical Company.
- Owens Corning.

Pactiv Building Products Division.

GLASS-FIBER BLANKET INSULATION

Available Manufacturers:

CertainTeed Corporation.

Guardian Fiberglass, Inc.

Johns Manville.

Knauf Fiber Glass.

Owens Corning.

Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

Where glass-fiber blanket insulation is indicated by the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated:

5-1/2 inches (140 mm) thick with a thermal resistance of 21 deg F x h x sq. ft./Btu at 75 deg F (3.7 K x sq. m/W at 24 deg C).

6-1/2 inches (165 mm) thick with a thermal resistance of 19 deg F x h x sq. ft./Btu at 75 deg F (3.3 K x sq. m/W at 24 deg C).

VAPOR RETARDERS

Polyethylene Vapor Retarders: ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).

Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

AUXILIARY INSULATING MATERIALS

Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

INSTALLATION, GENERAL

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

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

Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

If not otherwise indicated, extend insulation a minimum of 36 inches below exterior grade line.

On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

INSTALLATION OF GENERAL BUILDING INSULATION

Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:

Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.

Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

INSTALLATION OF INSULATION IN PARTITIONS FOR SOUND ATTENUATION

Weave 3-inch- (76-mm-) thick, unfaced glass-fiber blanket insulation in stagger stud partitions between units.

INSTALLATION OF VAPOR RETARDERS

General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (400 mm) o.c.

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 retarder.

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

END OF SECTION 07210

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

SUMMARY

This Section includes sealants for the following:

- Exterior joints in vertical surfaces and nontraffic horizontal surfaces.
- Interior joints in vertical surfaces and horizontal nontraffic surfaces.

See Division 8 Section "Glazing" for glazing sealants.

QUALITY ASSURANCE

Sealant Compatibility and Adhesion Testing: Use sealant manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates using test method indicated in Part 3 "Field Quality Control" Article.

PART 2 - PRODUCTS

MANUFACTURERS

In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

Products: Subject to compliance with requirements, provide one of the products specified.

MATERIALS, 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 sealant manufacturer based on testing and field experience.

Colors of Exposed Joint Sealants: As selected.

ELASTOMERIC JOINT SEALANTS

Elastomeric Sealants, General: ASTM C 920.

Medium-Modulus Neutral-Curing Silicone Sealant:

Available Products:

Dow Corning; 795.
NUCO Industries, Inc.; HiFlex 393.
Polymeric Systems, Inc.; PSI-631.

Type and Grade: S (single component) and NS (nonsag).
Class: 25.
Exposure: Use NT (nontraffic).
Substrates: Uses M, G, A, and, as applicable to joint substrates indicated, O.
Nonstaining to porous substrates when testing per ASTM C 1248 for substrates indicated.

JOINT-SEALANT BACKING

General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

Type: B, bicellular material with a surface skin.

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 where such adhesion would result in sealant failure. 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 with joint substrates.

Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

INSTALLATION

Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.

Remove foreign material from joint substrates that could interfere with adhesion of joint sealant.
Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, 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 from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Remove laitance and form-release agents from concrete. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues could interfere with adhesion of joint sealants.

Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

Sealant Installation: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

Install sealant backings to support sealants during application and at position required to produce 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 back of joints.

Place sealants so they directly contact and fully wet joint substrates.

Completely fill recesses provided for each joint configuration.
Produce uniform, cross-sectional shapes and depths that allow optimum sealant movement capability.

Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint.

Remove excess sealants from surfaces adjacent to joint.
Use tooling agents that are approved by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
Joint Configuration: Concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

Clean excess sealants or sealant smears adjacent to joints as installation progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 07920

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

SUMMARY

This Section includes steel doors.

SUBMITTALS

Product Data: For each product indicated. Include door designation, type, level and model, material description, label compliance, fire-resistance ratings, and finishes.

Door Schedule. Use same reference designations indicated on Drawings.

QUALITY ASSURANCE

Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.

Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

PART 2 - PRODUCTS

MANUFACTURERS

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

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

Amweld Building Products, Inc.
Benchmark Commercial Doors; a division of General Products Co., Inc.
Ceco Door Products; a United Dominion Company.
Copco Door Co.
Curries Company.
Deansteel Manufacturing, Inc.
Kewanee Corporation (The).
Mesker Door, Inc.
Pioneer Industries Inc.
Republic Builders Products.
Steelcraft; a division of Ingersoll-Rand.

MATERIALS

Hot-Rolled Steel Sheets: ASTM A 569/A 569M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.

Metallic-Coated Steel Sheets: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with an A40 (ZF120) zinc-iron-alloy (galvannealed) coating; stretcher-leveled standard of flatness.

Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Commercial Steel (CS), Class B coating; mill phosphatized; suitable for unexposed applications; stretcher-leveled standard of flatness where used for face sheets.

DOORS

Interior Doors: Complying with ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level indicated.

Level 2 and Physical Performance Level B, Mode 1 Full Flush..

Exterior Doors: Complying with ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level indicated.

Level 2 and Physical Performance Level B, Model 1 Full Flush.

FRAMES

General: ANSI A250.8; conceal fastenings, unless otherwise indicated.

Frame Steel Sheet Thickness:

0.053-inch- (1.3-mm-) for level 2 steel doors.

Door Silencers: Three silencers on single-door frames and two silencers on double-door frames.

Plaster Guards: 0.016-inch- (0.4-mm-) thick, steel sheet plaster guards or mortar boxes to close off interior of openings.

Supports and Anchors: Not less than 0.042-inch- (1.0-mm-) thick zinc-coated steel sheet.

Masonry Wall Anchors: 0.177-inch- (4.5-mm-) diameter, steel wire complying with ASTM A 510 (ASTM A 510M) may be used in place of steel sheet.

Inserts, Bolts, and Fasteners: Manufacturer's standard units. Zinc-coat items that are to be built into exterior walls according to ASTM A 153/A 153M, Class C or D as applicable.

FABRICATION

General: Fabricate steel door and frame units to comply with ANSI A250.8 free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant.

Exterior Doors: Fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- (1.3-mm-) thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.

Interior Door and Panel Faces: Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from cold-rolled steel sheet.

Core Construction: Manufacturer's standard insulated core construction that produces a door complying with SDI standards.

Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between pairs of doors. Not more than 3/4 inch (19 mm) at bottom.

Clearances for Fire-Rated Doors: As required by NFPA 80.

Door-Edge Profile: Beveled edge.

Tolerances: Comply with SDI 117.

Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.

Frame Construction:

- Fabricate frames with mitered or coped and continuously welded corners and seamless face joints.
- Provide temporary spreader bars.
- Fabricate knock-down frames with mitered or coped corners, for field assembly.
- Fabricate knock-down, drywall slip-on frames for in-place gypsum board partitions.
- Provide terminated stops.

Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

Locate hardware as indicated or, if not indicated, according to ANSI A250.8.

Glazing Stops: Manufacturer's standard, formed from 0.032-inch- (0.8-mm-) thick steel sheet.

- Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
- Provide screw-applied, removable, glazing stops on inside of glass, louvers, and other panels in doors.

Astragals: As required by NFPA 80 to provide fire ratings indicated.

FINISHES

Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

PART 3 - EXECUTION

INSTALLATION

Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

Wall Anchors: Provide at least three anchors per jamb. For openings 90 inches (2286 mm) or more in height, install an additional anchor at hinge and strike jambs.

Gypsum Board Partitions: For in-place partitions, install knock-down, drywall slip-on frames.

Fire-Rated Frames: Install according to NFPA 80.

Door Installation: Comply with ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.

Fire-Rated Doors: Install within clearances specified in NFPA 80.

After installation, remove protective wrappings from doors and frames and touch up prime coat with compatible air-drying primer.

END OF SECTION 08110

SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

SUMMARY

This Section includes solid core doors as follows:

Doors with wood-veneer faces.

See Division 6 Section "Finish Carpentry" for wood door frames.

SUBMITTALS

Product Data: For each type of door. Include factory-finishing specifications.

Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details; location and extent of hardware blocking; mortises, holes, and cutouts; and other pertinent data.

Samples: For each face material and finish.

QUALITY ASSURANCE

Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated."

PART 2 - PRODUCTS

DOOR CONSTRUCTION

Doors for Transparent Finish:

Grade: Custom (Grade A faces).

Species and Cut: White birch, rotary cut or red oak, plain sliced, or white ash, plain sliced, or white oak, rift cut..

Assembly of Veneer Leaves on Door Faces: Runing match.

Interior Veneer-Faced Solid-Core Doors:

Core: Either glued block or structural composite lumber.

Construction: Seven plies, either bonded or nonbonded construction.

FABRICATION

Fabricate doors in sizes indicated for Project-site fitting.

Factory machine doors for hardware that is not surface applied.

PART 3 - EXECUTION

INSTALLATION

Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.

Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

END OF SECTION 08211

SECTION 08711 - DOOR HARDWARE

PART 1 - GENERAL

SUMMARY

This Section includes the following:

Door hardware.

SUBMITTALS

Product Data: For each product indicated.

Door Hardware Schedule: Organized into door hardware sets indicating type, style, function, size, label, hand, manufacturer, fasteners, location, and finish of each door hardware item. Include description of each electrified door hardware function, including sequence of operation.

Keying Schedule: Detail Owner's final keying instructions for locks.

Product certificates.

QUALITY ASSURANCE

Supplier Qualifications: Person who is or employs a qualified DHI Architectural Hardware Consultant.

Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying schedule.

Keys: Deliver keys to Owner.

Templates: Obtain and distribute templates for doors, frames, and other work specified to be factory prepared for installing door hardware.

Certified Products: Provide door hardware that is listed in BHMA directory of certified products.

WARRANTY

Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within warranty period.

Warranty Period for Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

MANUFACTURERS

Basis-of-Design Product: Product named for each door hardware item indicated in Door Hardware Sets establishes the basis of design. Provide either the named product or a comparable product by one of the manufacturers specified for each type of hardware item.

DOOR HARDWARE

Scheduled Door Hardware: Provide door hardware according to Door Hardware Sets at the end of Part 3. Manufacturers' names are abbreviated.

PIVOTS AND HINGES

Manufacturers:

Hinges:

Baldwin Hardware Corporation (BH).
Hager Companies (HAG).
McKinney Products Company; Div. of ESSEX Industries, Inc. (MCK).
Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
Stanley Commercial Hardware; Div. of The Stanley Works (STH).

General: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

Hinge Base Metal: Unless otherwise indicated, provide the following:

Exterior Hinges: Stainless steel, with stainless-steel pin. Brass, with stainless-steel pin body and brass protruding heads.
Interior Hinges: Steel, with steel pin.
Hinges for Fire-Rated Assemblies: Steel, with steel pin.

Nonremovable Pins: Provide set screw in hinge barrel that prevents removal of pin while door is closed; for outswinging exterior doors.

Screws: Phillips flat-head screws; screw heads finished to match surface of hinges.

Metal Doors and Frames: Machine screws (drilled and tapped holes).
Wood Doors and Frames: Wood screws.

MECHANICAL LOCKS AND LATCHES

Manufacturers:

Best Lock Corporation (BLC).
Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
Glynn-Johnson; an Ingersoll-Rand Company (GJ).
Hager Companies (HAG).
Ives, H. B. (IVS).
Lockwood Architectural Hardware; Div. of Lloyd Matheson Inc. (LAH).
McKinney Products Company; Div. of ESSEX Industries, Inc. (MCK).
NT Falcon Lock Co.; an Ingersoll-Rand Company (NTF).
Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
Schlage Lock Company; an Ingersoll-Rand Company (SCH).
Triangle Brass Manufacturing Company, Inc. (TBM).
Weiser Lock; Div. of Masco Building Products Corporation (WEI).
Yale Security Inc.; Div. of Williams Holdings (YAL).

Bored Lockset Design: As scheduled.

Dummy Trim: Match lever lock trim and escutcheons.

Lock Throw: Comply with labeled fire door requirements.

Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

STOPS AND HOLDERS

Stops and Holders: Provide floor stops for doors, unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

Manufacturers:

Architectural Builders Hardware Mfg., Inc. (ABH).
Baldwin Hardware Corporation (BH).
Burns Manufacturing Incorporated (BM).
Glynn-Johnson; an Ingersoll-Rand Company (GJ).
Hager Companies (HAG).
Ives, H. B. (IVS).
LCN Closers; an Ingersoll-Rand Company (LCN).
Norton Door Controls; Div. of Yale Security Inc. (NDC).
NT Dor-O-Matic Hardware Div.; an Ingersoll-Rand Company (NTD).
NT Quality Hardware; an Ingersoll-Rand Company (NTQ).
Rixson-Firemark, Inc.; Div. of Yale Security Inc. (RIX).
Rockwood Manufacturing Company (RM).
Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
Triangle Brass Manufacturing Company, Inc. (TBM).
Yale Security Inc.; Div. of Williams Holdings (YAL).

Silencers for Door Frames: Neoprene or rubber; fabricated for drilled-in application to frame.

DOOR GASKETING AND THRESHOLDS

Door Gasketing: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

Manufacturers:

Gasketing:

Hager Companies (HAG).
National Guard Products, Inc. (NGP).
Pemko Manufacturing Co., Inc. (PEM).
Reese Enterprises, Inc. (RE).
Sealeze Corporation (SEL).
Ultra Industries; a Macklanburg-Duncan Company (ULT).
Zero International, Inc. (ZRO).

Door Bottoms:

Hager Companies (HAG).
National Guard Products, Inc. (NGP).
Pemko Manufacturing Co., Inc. (PEM).
Reese Enterprises, Inc. (RE).
Sealeze Corporation (SEL).
Ultra Industries; a Macklanburg-Duncan Company (ULT).
Zero International, Inc. (ZRO).

Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.

Gasketing Materials: Comply with ASTM D 2000 and AAMA 701/702.

Thresholds: Of type scheduled or indicated.

Manufacturers:

Hager Companies (HAG).
National Guard Products, Inc. (NGP).
NT Dor-O-Matic Hardware Div.; an Ingersoll-Rand Company (NTD).
Pemko Manufacturing Co., Inc. (PEM).
Reese Enterprises, Inc. (RE).
Rixson-Firemark, Inc.; Div. of Yale Security Inc. (RIX).
Ultra Industries; a Macklanburg-Duncan Company (ULT).
Zero International, Inc. (ZRO).

CYLINDERS, KEYING, AND STRIKES

Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

Number of Pins: Six.

High-Security Grade: BHMA Grade 1A, listed and labeled as complying with UL 437 (Suffix A).

Permanent Cores: Manufacturer's standard; finish face to match lockset.

Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

Strikes: Manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

FABRICATION

Base Metals: Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials if different from specified standard.

Fasteners: Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated. Provide steel machine or wood screws or steel through bolts for fire-rated applications.

Spacers or Sex Bolts: For through bolting of hollow metal doors.

Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

Finishes: Comply with BHMA A156.18.

PART 3 - EXECUTION

INSTALLATION

Examine doors and frames for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

Steel Door and Frame Preparation: Comply with DHI A115 series. Drill and tap doors and frames for surface-applied hardware according to SDI 107.

Wood Door Preparation: Comply with DHI A115-W series.

Mounting Heights: Comply with the following requirements, unless otherwise indicated:

Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."

Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

Adjust and reinforce attachment substrates as necessary for proper installation and operation. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with accessibility requirements.

Door Closers: Adjust sweep period so that from an open position of 70 degrees, the door will take at least three seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

END OF SECTION 08711

SECTION 09260 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

SUMMARY

This Section includes the following:

Interior gypsum wallboard.

PART 2 - PRODUCTS

PANEL PRODUCTS

Panel Size, General: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

Gypsum Wallboard: ASTM C 36.

Type X: 5/8 inch thick with long edges tapered.

TRIM ACCESSORIES

Interior Trim: ASTM C 1047.

Cornerbead: Use at outside corners.

LC-Bead: Use at exposed panel edges.

JOINT TREATMENT MATERIALS

General: Comply with ASTM C 475.

Joint Tape:

Interior Gypsum Wallboard: Paper.

Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

Prefilling: At open joints and damaged surface areas, use setting-type taping compound.

Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.

Use setting-type compound for installing paper-faced metal trim accessories.

Fill Coat: For second coat, use setting-type, sandable topping compound.

Finish Coat: For third coat, use setting-type, sandable topping compound.

Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

AUXILIARY MATERIALS

General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

PART 3 - EXECUTION

PANEL PRODUCT INSTALLATION

Gypsum Board: Comply with ASTM C 840 and GA-216.

Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.

On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.

On partitions/walls, apply gypsum panels vertically (parallel to framing) or horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

Stagger abutting end joints not less than one framing member in alternate courses of board.

FINISHING

Installing Trim Accessories: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

Finishing Gypsum Board Panels: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.

Prefill open joints, rounded or beveled edges, and damaged surface areas.

Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.

END OF SECTION 09260

SECTION 09651 - RESILIENT FLOOR TILE

PART 1 - GENERAL

SUMMARY

This Section includes the following:

Vinyl composition tile (VCT).

SUBMITTALS

Product Data: For each product indicated.

PROJECT CONDITIONS

Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C)] or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following time periods:

48 hours before installation.

During installation.

48 hours after installation.

After postinstallation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).

Close spaces to traffic during floor covering installation.

Close spaces to traffic for 48 hours after floor covering installation.

Install resilient products after other finishing operations, including painting, have been completed.

EXTRA MATERIALS

Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

VINYL COMPOSITION TILE

Vinyl Composition Tile (VCT): ASTM F 1066.

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

Armstrong World Industries, Inc.
Azrock Commercial Flooring, DOMCO.
Congoleum Corporation.
Mannington Mills, Inc.
Tarkett Inc.

Color and Pattern: As selected from manufacturer's full range of lighter colors.

Class: 2 (through-pattern tile).

Wearing Surface: Smooth.

Thickness: 0.125 inch (3.2 mm).

Size: 12 by 12 inches (305 by 305 mm).

Fire-Test-Response Characteristics:

Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

INSTALLATION MATERIALS

Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturer for applications indicated.

Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

PREPARATION

Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

Concrete Substrates: Prepare according to ASTM F 710.

Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

Moisture Testing:

Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

Do not install resilient products until they are same temperature as space where they are to be installed.

Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

INSTALLATION

Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

Lay tiles square with room axis.

Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

Lay tiles with grain running in one direction.

Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

Extend tiles into toe spaces, door reveals, closets, and similar openings.

Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

Perform the following operations immediately after completing resilient product installation:

Remove adhesive and other blemishes from exposed surfaces.
Sweep and vacuum surfaces thoroughly.

1	Damp-mop surfaces to remove marks and soil.	1
2		2
3	Do not wash surfaces until after time period recommended by manufacturer.	3
4		4
5	Protect resilient products from mars, marks, indentations, and other damage from construction operations	5
6	and placement of equipment and fixtures during remainder of construction period. Use protection	6
7	methods recommended in writing by manufacturer.	7
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10	END OF SECTION 09651	10
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SECTION 09680 - CARPET

PART 1 - GENERAL

SUMMARY

This Section includes tufted carpet.

SUBMITTALS

Product Data: For each product indicated.

Shop Drawings: Include the following:

Seam locations.

Pattern type, repeat, location, direction, and starting point.

Pile direction.

Transition, and other accessory strips.

Transition details to other flooring materials.

Samples: For each for each carpet and exposed accessory and for each color and pattern required.

Product Schedule: Use same room and product designations indicated on Drawings and in schedules.

Maintenance data.

DELIVERY, STORAGE, AND HANDLING

Comply with CRI 104, Section 5, "Storage and Handling."

PROJECT CONDITIONS

General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."

Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by manufacturer.

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WARRANTY

Carpet Warranty: Manufacturer's standard form in which manufacturer agrees to replace carpet that does not comply with requirements or that fails within 10 years from date of Substantial Completion. Warranty does not include deterioration or failure of carpet from unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

PART 2 - PRODUCTS

CARPET

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

PART 3 - EXECUTION

INSTALLATION

Comply with CRI 104, Section 8, "Direct Glue-Down."

Comply with CRI 104, Section 12, "Carpet on Stairs."

Maintain uniformity of carpet direction and lay of pile. At doorways, center seams under door in closed position. Bind or seal cut edges as recommended by carpet manufacturer.

Install pattern parallel to walls and borders.

END OF SECTION 09680

SECTION 09911 - PAINTING

PART 1 - GENERAL

SUMMARY

This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

PROJECT CONDITIONS

Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain storage containers in a clean condition, free of foreign materials and residue.

Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).

Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).

Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

PAINT MATERIALS, GENERAL

Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

Colors: As selected from manufacturer's full range.

PREPARATORY COATS

Concrete Unit Masonry Block Filler: High-performance latex block filler of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

Exterior Primer: Exterior alkyd or latex-based primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

Ferrous-Metal and Aluminum Substrates: Rust-inhibitive metal primer.
Zinc-Coated Metal Substrates: Galvanized metal primer.
Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

Interior Primer: Interior latex-based or alkyd primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

Ferrous-Metal Substrates: Quick drying, rust-inhibitive metal primer.
Zinc-Coated Metal Substrates: Galvanized metal primer.
Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

EXTERIOR FINISH COATS

Exterior Low-Luster Acrylic Paint:

Benjamin Moore; MoorGard Latex House Paint No. 103.
Pittsburgh Paints; 76 Line Sun-Proof Exterior House & Trim Acrylic Satin Latex.
Sherwin-Williams; SuperPaint Exterior Latex Satin Wall Paint A89 Series.

Exterior Full-Gloss Acrylic Enamel for Concrete, Masonry, and Wood:

Benjamin Moore; Impervex Latex High Gloss Metal & Wood Enamel No. 309.
Pittsburgh Paints; 90 Line Pitt-Tech One Pack Interior/Exterior High Performance Waterborne High Gloss DTM Industrial Enamels.
Pittsburgh Paints; 52-Line Brilliant Reflections Interior/Exterior Latex Gloss Enamel.
Sherwin-Williams; SuperPaint Exterior High Gloss Latex Enamel A85 Series.

Exterior Full-Gloss Acrylic Enamel for Ferrous and Other Metals:

Benjamin Moore; Impervex Enamel High Gloss Metal & Wood Enamel No. 309.
Pittsburgh Paints; 51-Line Brilliant Reflections Interior/Exterior Latex Gloss Enamel.
Sherwin-Williams; DTM Acrylic Coating Gloss (Waterborne) B66W100 Series.

INTERIOR FINISH COATS

Interior Flat Latex-Emulsion Size:

Benjamin Moore; Colorscapes Interior Latex Flat No. 515.
Sherwin-Williams; SuperPaint Flat Wall Paint A86 Series.

Interior Low-Luster Acrylic Enamel:

Benjamin Moore; Moore's Regal AquaVelvet No. 319.
Pittsburgh Paints; 89-Line Manor Hall Interior Eggshell Wall and Trim.
Sherwin-Williams; SuperPaint Interior Latex Satin Wall Paint A87 Series.

Interior Full-Gloss Acrylic Enamel:

Benjamin Moore; Impervex Enamel No. 309.

Pittsburgh Paints; 51 Line Brilliant Reflections Interior/Exterior Latex Gloss Enamel.
Sherwin-Williams; ProMar 200 Interior Latex Gloss Enamel B21W201.

INTERIOR WOOD STAINS AND VARNISHES

Open-Grain Wood Filler:

Benjamin Moore; Benwood Paste Wood Filler No. 238.
Pittsburgh Paints; none required.
Sherwin-Williams; Sher-Wood Fast-Dry Filler.

Interior Wood Stain: Alkyd based.

Benjamin Moore; Benwood Penetrating Stain No. 234.
Pittsburgh Paints; 77-560 Rez Interior Semi-Transparent Oil Stain.
Sherwin-Williams; Wood Classics Interior Oil Stain A-48 Series.

Interior Waterborne Clear Gloss Varnish: Acrylic-based polyurethane.

Benjamin Moore; Benwood Interior Wood Finishes Polyurethane Finishes High Gloss No. 428.
Pittsburgh Paints; 77-45 Rez Full-Gloss Acrylic Clear Polyurethane.
Sherwin-Williams; Wood Classics Waterborne Polyurethane Gloss, A68 Series.

Paste Wax: As recommended by manufacturer.

PART 3 - EXECUTION

APPLICATION

Comply with procedures specified in PDCA P4 for inspection and acceptance of surfaces to be painted.

Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

Provide barrier coats over incompatible primers or remove and reprime.

Cementitious Materials: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

1 Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and 1
2 sandpaper, as required. Sand surfaces exposed to view smooth and dust off. 2
3 3

4 Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other 4
5 recommended knot sealer before applying primer. After priming, fill holes and imperfections 5
6 in finish surfaces with putty or plastic wood filler. Sand smooth when dried. 6
7 Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, 7
8 undersides, and back sides of wood, including cabinets, counters, cases, and paneling. 8
9 If transparent finish is required, backprime with spar varnish. 9
10 Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or 10
11 sealer immediately on delivery. 11
12 12

13 Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; 13
14 remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical 14
15 cleaning methods that comply with SSPC's recommendations. 15

16 Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, 16
17 clean with solvents recommended by paint manufacturer, and touch up with same primer as 17
18 the shop coat. 18
19 19

20 Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is 20
21 free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated 21
22 from coil stock by mechanical methods. 22
23 23

24 Material Preparation: 24

25 25
26 Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials 26
27 and residue. 27
28 Stir material before application to produce a mixture of uniform density. Stir as required during 28
29 application. Do not stir surface film into material. If necessary, remove surface film and strain 29
30 material before using. 30
31 31

32 Exposed Surfaces: Include areas visible when permanent or built-in fixtures, grilles, convactor covers, 32
33 covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as 33
34 required, to maintain system integrity and provide desired protection. 34
35 35

36 Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. 36
37 Before final installation of equipment, paint surfaces behind permanently fixed equipment or 37
38 furniture with prime coat only. 38
39 Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers 39
40 or grilles. 40
41 Paint back sides of access panels and removable or hinged covers to match exposed surfaces. 41
42 Finish exterior doors on tops, bottoms, and side edges the same as exterior faces. 42
43 Finish interior of wall and base cabinets and similar field-finished casework to match exterior. 43
44 44

45 Sand lightly between each succeeding enamel or varnish coat. 45
46 46

47 Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise 47
48 prepared for painting as soon as practicable after preparation and before subsequent surface 48
49 deterioration. 49
50 50

51 Omit primer over metal surfaces that have been shop primed and touchup painted. 51
52 If undercoats, stains, or other conditions show through final coat of paint, apply additional coats 52
53 until paint film is of uniform finish, color, and appearance. 53
54 54
55 55
56 56

Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.

Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

CLEANING AND PROTECTING

At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

EXTERIOR PAINT SCHEDULE

Smooth Wood:

Acrylic Finish: Two finish coats over a primer.

Primer: Exterior wood primer for acrylic enamels.

Finish Coats: Exterior semigloss acrylic enamel.

Alkyd-Enamel Finish: Two finish coats over a primer.

Primer: Exterior wood primer for alkyd enamels.

1	Finish Coats: Exterior full-gloss alkyd enamel.	1
2		2
3	Wood Trim:	3
4		4
5	Acrylic-Enamel Finish: Two finish coats over a primer.	5
6		6
7	Primer: Exterior wood primer for acrylic enamels.	7
8	Finish Coats: Exterior semigloss acrylic enamel, or	8
9		9
10	Alkyd-Enamel Finish: Two finish coats over a primer.	10
11		11
12	Primer: Exterior wood trim primer for full-gloss alkyd enamels.	12
13	Finish Coats: Exterior full-gloss alkyd enamel.	13
14		14
15	Ferrous Metal:	15
16		16
17	Acrylic Finish: Two finish coats over a rust-inhibitive primer.	17
18		18
19	Primer: Exterior ferrous-metal primer (not required on shop-primed items).	19
20	Finish Coats: Exterior semigloss acrylic enamel, or	20
21		21
22	Alkyd-Enamel Finish: Two finish coats over a rust-inhibitive primer.	22
23		23
24	Primer: Exterior ferrous-metal primer (not required on shop-primed items).	24
25	Finish Coats: Exterior full-gloss alkyd enamel.	25
26		26
27	Zinc-Coated Metal:	27
28		28
29	Alkyd-Enamel Finish: Two finish coats over a galvanized metal primer.	29
30		30
31	Primer: Exterior galvanized metal primer.	31
32	Finish Coats: Exterior full-gloss alkyd enamel.	32
33		33
34	Aluminum:	34
35		35
36	Alkyd-Enamel Finish: Two finish coats over a primer.	36
37		37
38	Primer: Exterior aluminum primer under alkyd finishes.	38
39	Finish Coats: Exterior full-gloss alkyd enamel.	39
40		40
41		41
42	<u>INTERIOR PAINT SCHEDULE</u>	42
43		43
44	Gypsum Board:	44
45		45
46	Latex Finish: Two finish coats over a primer.	46
47		47
48	Primer: Interior gypsum board primer.	48
49	Finish Coats: Interior low-luster latex enamel.	49
50		50
51	Wood and Hardboard:	51
52		52
53	Acrylic-Enamel Finish: Two finish coats over a primer.	53
54		54
55		55
56		56

1	Primer: Interior wood primer for acrylic-enamel and semigloss alkyd-enamel finishes.	1
2	Finish Coats: Interior full-gloss acrylic enamel.	2
3		3
4	Ferrous Metal:	4
5		5
6	Acrylic Finish: Two finish coats over a primer.	6
7		7
8	Primer: Interior ferrous-metal primer.	8
9	Finish Coats: Interior full-gloss acrylic enamel.	9
10		10
11	Zinc-Coated Metal:	11
12		12
13	Acrylic Finish: Two finish coats over a primer.	13
14		14
15	Primer: Interior zinc-coated metal primer.	15
16	Finish Coats: Interior full-gloss acrylic enamel.	16
17		17
18		18
19	<u>INTERIOR STAIN AND NATURAL-FINISH WOODWORK SCHEDULE</u>	19
20		20
21	Stain-Varnish Finish: Two finish coats of varnish over a sealer coat and interior wood stain. Wipe wood	21
22	filler before applying stain.	22
23		23
24	Filler Coat: Open-grain wood filler.	24
25	Stain Coat: Interior wood stain.	25
26	Sealer Coat: Clear sanding sealer.	26
27	Finish Coats: Interior waterborne clear gloss varnish.	27
28		28
29		29
30	END OF SECTION 09911	30
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SECTION 10801 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

SUMMARY

This Section includes the following:

Toilet and bath accessories.

SUBMITTALS

Product Data: For each product indicated.

Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use room designations indicated on Drawings.

WARRANTY

Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace mirrors that develop visible silver spoilage defects within 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

MANUFACTURERS

Basis-of-Design Products: The design for toilet and bath accessories described in Part 2 are based on products indicated. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

Toilet and Bath Accessories:

A & J Washroom Accessories, Inc.
American Specialties, Inc.
Bobrick Washroom Equipment, Inc.
Bradley Corporation.
General Accessory Manufacturing Co. (GAMCO).
McKinney/Parker Washroom Accessories Corp.

MATERIALS

Stainless Steel: ASTM A 666, Type 304, No. 4 finish (satin), 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.

Brass: ASTM B 19, ASTM B 16 (ASTM B 16M), or ASTM B 30 castings.

Steel Sheet: ASTM A 366/A 366M, 0.0359-inch (0.9-mm) minimum nominal thickness.

Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).

Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.

Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.

Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

TOILET AND BATH ACCESSORIES

Toilet Tissue Dispenser:

Basis-of-Design Product: Bradley Model 5106-52.

Type: Single-roll dispenser.

Mounting: Surface mounted with concealed anchorage.

Material: Stainless steel.

Operation: Noncontrol delivery with standard spindle.

Capacity: Designed for 4-1/2- or 5-inch- (114- or 127-mm-) diameter-core tissue rolls.

PART 3 - EXECUTION

INSTALLATION

Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

END OF SECTION 10801

SECTION 13125 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

SUMMARY

This Section includes metal building systems that consist of integrated sets of mutually dependent components including structural framing roof panels, wall panels, soffit panels, doors, windows and accessories.

See Division 3 Section "Cast-in-Place Concrete" for concrete foundations, slabs, and anchor-bolt installation.

SYSTEM PERFORMANCE REQUIREMENTS

Structural Performance: Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

Engineer metal building systems according to procedures in MBMA's "Metal Building Systems Manual."

Design Loads: As required by ASCE 7, "Minimum Design Loads for Buildings and Other Structures."

Seismic Performance: Design and engineer metal building systems capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

Thermal Movements: Provide metal panel systems that allow for thermal movements resulting from maximum change of 100°F 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.

Thermal Performance: Provide insulated metal panel assemblies with the following maximum U-factors and minimum R-values for opaque elements when tested according to ASTM C 1363 or ASTM C 518:

Metal Roof Panel Assemblies:

R-Value: 19

Metal Wall Panel Assemblies:

R-Value: 19

Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

SUBMITTALS

Product Data: For each type of metal building system component indicated.

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

For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

Anchor-Bolt Plans: Submit anchor-bolt plans before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.

Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

Metal roof and wall Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.

Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:

Name and location of Project.

Order number.

Name of manufacturer.

Name of Contractor.

Building dimensions including width, length, height, and roof slope.

Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.

Governing building code and year of edition.

Design loads and load combinations.

Building-use category.

AISC Certification for Category MB: Include statement that metal building system and components were designed and produced in an AISC-Certified Facility by an AISC-Certified Manufacturer.

Manufacturer certificate.

QUALITY ASSURANCE

Erector Qualifications: An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

Manufacturer Qualifications: A qualified manufacturer.

AISC Certification for Category MB: An AISC-Certified Manufacturer that designs and produces metal building systems and components in an AISC-Certified Facility.

Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

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

Structural Steel: Comply with AISC's "Specification for Structural Steel Buildings--Allowable Stress Design, Plastic Design," or AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings," for design requirements and allowable stresses.

Cold-Formed Steel: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members," or AISI's "Load and Resistance Factor Design Specification for Steel Structural Members," for design requirements and allowable stresses.

Pre-Erection Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to metal building systems including, but not limited to, the following:

Review required testing, inspecting, and certifying procedures.

DELIVERY, STORAGE, AND HANDLING

Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness and with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

PROJECT CONDITIONS

Established Dimensions for Foundations: Comply with established dimensions on approved anchor-bolt plans, establishing foundation dimensions and proceeding with fabricating structural framing without field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.

COORDINATION

Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

Coordinate installation of roof curbs, equipment supports, and roof penetrations.

WARRANTY

Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

Siliconized Polyester Finish: Deterioration includes, but is not limited to, the following:

Color fading more than 15 Hunter units when tested according to ASTM D 2244.

Chalking in excess of a No. 2 rating when tested according to ASTM D 4214.

Cracking, checking, peeling, or failure of paint to adhere to bare metal.

PART 2 - PRODUCTS

MANUFACTURERS

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

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

Sunward Corporation

STRUCTURAL-FRAMING MATERIALS

W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).

Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).

Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).

Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55 (205 through 380), or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480); or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80 (170 through 550), or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480).

Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550) or High-Strength Low Alloy Steel (HSLAS), Grades 50 through 80 (340 through 550); with G60 (Z180) coating designation; mill phosphatized.

Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550) or High-Strength Low Alloy Steel (HSLAS), Grades 50 through 80 (340 through 550); with G90 (Z275) coating designation.

Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Structural Steel (SS), Grade 50 or 80 (340 or 550); with Class AZ50 (AZM150) coating.

Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts; ASTM A 563 (ASTM A 563M) carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.

High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex-head steel structural bolts with splined ends.

High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers, plain.

Primer: SSPC-Paint 15, Type I, red oxide.

MATERIALS FOR FIELD-ASSEMBLED METAL PANELS

Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550), with G90 (Z275) coating designation.

Surface: Smooth, flat finish.

Exposed Finishes: Apply the following coil coating, as specified or indicated on Drawings:

Siliconized-Polyester Coating: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.

Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored backer finish, consisting of prime coat and wash coat with a total minimum dry film thickness of 0.5 mil (0.013 mm).

THERMAL INSULATION FOR FIELD-ASSEMBLED METAL PANELS

Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. (8-kg/cu. m) density; 2-inch- (50-mm-) wide, continuous, vapor-tight edge tabs; and with a flame-spread index of 25 or less.

Vapor-Retarder Facing: ASTM C 1136, with permeance not greater than 0.02 perm (1.15 ng/Pa x s x sq. m) when tested according to ASTM E 96, Desiccant Method.

Retainer Strips: 0.019-inch- (0.5-mm-) thick, formed, galvanized steel or PVC retainer clips colored to match insulation facing.

Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

DOOR AND FRAME MATERIALS

Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with G60 (Z180) zinc (galvanized) or A60 (ZF180) zinc-iron-alloy (galvannealed) coating designation.

MISCELLANEOUS MATERIALS

Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.

Fasteners for Metal Roof and Wall Panels: Self-drilling Type 410 stainless-steel or self-tapping Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal panels.

Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

Metal Panel Sealants:

Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing.

Joint Sealant: ASTM C 920; one-part elastomeric polyurethane, polysulfide, or silicone-rubber sealant.

FABRICATION, GENERAL

Tolerances: Comply with MBMA's "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."

Metal Panels: Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

STRUCTURAL FRAMING

General:

Primary Framing: Shop fabricate framing components to indicated size and section with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

Make shop connections by welding or by using high-strength bolts.

Join flanges to webs of built-up members by a continuous submerged arc-welding process.

Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin or girt web, so flange compressive strength is within allowable limits for any combination of loadings.

Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary structural members with specified primer after fabrication.

Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for

erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary structural members with specified primer after fabrication.

Primary Framing: Manufacturer's standard structural primary framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing. Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.

Rigid Modular Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide interior columns fabricated from shop-welded, built-up steel plates.

Frame Configuration: Single gable.

Exterior Column Type: Tapered.

Rafter Type: Tapered.

End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch (1.5 mm).

End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch (1.5 mm); or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.

Secondary Framing: Manufacturer's standard secondary framing members, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet prepainted with coil coating, unless otherwise indicated, to comply with the following:

Purlins: C- or Z-shaped sections; fabricated from minimum 0.0598-inch- (1.5-mm-) thick steel sheet, built-up steel plates, or structural-steel shapes; minimum 2-1/2-inch- (64-mm-) wide flanges.

Depth: As required to comply with system performance requirements.

Girts: C- or Z-shaped sections; fabricated from minimum 0.0598-inch- (1.5-mm-) thick steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees to flange and with minimum 2-1/2-inch- (64-mm-) wide flanges.

Depth: As required to comply with system performance requirements.

Eave Struts: Unequal-flange, C-shaped sections; fabricated from 0.0598-inch- (1.5-mm-) thick steel sheet, built-up steel plates, or structural-steel shapes; to provide adequate backup for metal panels.

Flange Bracing: Minimum 2-by-2-by-1/8-inch (51-by-51-by-3-mm) structural-steel angles or 1-inch (25-mm) diameter, cold-formed structural tubing to stiffen primary frame flanges.

Sag Bracing: Minimum 1-by-1-by-1/8-inch (25-by-25-by-3-mm) structural-steel angles.

Base or Sill Angles: Minimum 3-by-2-by-0.0598-inch (76-by-51-by-1.5-mm) zinc-coated (galvanized) steel sheet.

Purlin and Girt Clips: Minimum 0.0598-inch- (1.5-mm-) thick, steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.

Secondary End-Wall Framing: Manufacturer's standard sections fabricated from minimum 0.0598-inch- (1.5-mm-) thick, structural steel sheet.

Framing for Openings: Channel shapes; fabricated from minimum 0.0598-inch- (1.5-mm-) thick, cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.

Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

Bracing: Provide adjustable wind bracing as follows:

Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.

Bolts: Provide plain finish bolts for structural-framing components that are primed or finish painted. Provide zinc-plated or hot-dipped galvanized bolts for structural-framing components that are galvanized.

Factory-Primed Finish: Apply specified primer immediately after cleaning and pretreating.

Prime primary, secondary, and end-wall structural-framing members to a minimum dry film thickness of 1 mil (0.025 mm).

Prime secondary steel framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil (0.013 mm) on each side.

Prime galvanized members with specified primer, after phosphoric acid pretreatment.

METAL ROOF PANELS

Vertical-Rib, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.

Material: Aluminum-zinc alloy-coated steel sheet.

Exterior Finish: Mill finish.

Clips: Manufacturer's standard, floating type to accommodate thermal movement; fabricated from zinc-coated (galvanized) steel, aluminum-zinc alloy-coated steel, or stainless-steel sheet.

Joint Type: Mechanically seamed folded as standard with manufacturer.

FIELD-ASSEMBLED METAL WALL PANELS

Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.

Material: Aluminum-zinc alloy-coated steel sheet.

Exterior Finish: Siliconized polyester.

Color: As selected by Owner from manufacturer's full range.

METAL SOFFIT PANELS

General: Provide factory-formed metal soffit panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.

Metal Soffit Panels: Match profile and material of metal wall panels.

Finish: Match finish and color of metal wall panels.

DOORS AND FRAMES

Fire-Rated Personnel Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

Swinging Personnel Doors and Frames: Metal building system manufacturer's standard doors and frames; prepared and reinforced at strike and hinges to receive factory- and field-applied hardware according to ANSI/DHI A115 Series.

Steel Doors: 1-3/4 inches (44 mm) thick; fabricated from 0.0329-inch- (0.85-mm-) uncoated thickness, metallic-coated steel face sheets; of styles indicated; seamless at both vertical edges; with 0.0528-inch- (1.35-mm-) uncoated thickness, inverted metallic-coated steel channels welded to face sheets at top and bottom of door.

Core: Polyurethane foam.

Glazing Frames: Steel frames to receive field-installed glass.

Glazing: Insulating glass.

Steel Frames: Fabricate 2-inch- (51-mm-) wide face frames from 0.0528-inch- (1.35-mm-) uncoated thickness, metallic-coated steel sheet.

Type: Factory welded.

Hardware: Comply with Division 8 Section "Door Hardware."

Anchors and Accessories: Manufacturer's standard units, galvanized according to ASTM A 123/A 123M.

Finishes for Personnel Doors and Frames:

Surface Preparation: Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

Factory Priming for Field-Painted Finish: Immediately after cleaning and pretreating, apply manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria.

WINDOWS

Aluminum Windows: Metal building system manufacturer's standard, with self-flashing mounting fins, and as follows:

Type, Performance Class, and Performance Grade: Comply with AAMA/NWWDA 101/I.S.2 and as follows:

Horizontal-Sliding Units: HS-C30.

Single-Hung Units: H-C30.

Fixed Units: F-C30.

Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 0.062-inch (1.6-mm) thickness at any location for main frame and sash members.

Thermally Improved Construction: Fabricate window units 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.

Fasteners, Anchors, and Clips: Aluminum, nonmagnetic stainless steel, or other noncorrosive material, compatible with aluminum window members, trim, hardware, anchors, and other components of window units. Fasteners shall not be exposed, except for attaching hardware.

Hardware: Manufacturer's standard; of aluminum, stainless steel, die-cast steel, malleable iron, or bronze.

Sliding-Type Weather Stripping: Woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric; complying with AAMA 701/702.

Insect Screens: Provide removable insect screen on each operable exterior sash, with screen frame finished to match window unit, and as follows:

Fabric: Aluminum wire fabric mesh of 0.013-inch- (0.3-mm-) diameter, coated aluminum wire.

Baked-Enamel Finish: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 0.7 mil (0.02 mm), medium gloss. Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.

Color: As selected by Owner from manufacturer's full range.

Glazing: Insulating glass.

ACCESSORIES

General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels, unless otherwise indicated.

Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.

Clips: Manufacturer's standard, formed from stainless steel sheet, designed to withstand negative-load requirements.

Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet or nylon-coated aluminum sheet.

Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.

Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.

Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

Flashing and Trim: Formed from minimum 0.0159-inch- (0.40-mm-) thick, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.

SOURCE QUALITY CONTROL

Testing Agency: Owner will engage a qualified testing and inspecting agency to perform the following tests and inspections and to submit reports.

Special Inspector: Owner will engage a qualified special inspector to perform the following tests and inspections and to submit reports. Special Inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.

Special inspections will not be required if fabrication is performed by a manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.

After fabrication, submit certificate of compliance with copy to authorities having jurisdiction certifying that Work was performed according to Contract requirements.

Tests and Inspections:

Bolted Connections: Shop-bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

Welded Connections: In addition to visual inspection, shop-welded connections shall be tested and inspected according to AWS D1.1.

PART 3 - EXECUTION

ERECTION

Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.

Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.

Erect metal building system according to manufacturer's written erection instructions and erection drawings.

Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

Set structural framing accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

Base and Bearing 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.
Tighten 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 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 shrinkage-resistant grouts.

Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure.

Primary Framing and End Walls: Erect framing true to line, level, plumb, rigid, and secure. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist cure grout for not less than seven days after placement.

Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and snug-tightened or pretensioned joints.

Secondary Framing: Erect framing true to line, level, plumb, rigid, and secure. Fasten secondary framing to primary framing using clips with field connections using non-high-strength bolts.

Provide rake or gable purlins with tight-fitting closure channels and fasciae.
Locate and space wall girts to suit openings such as doors and windows.

Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.

Tighten rod and cable bracing to avoid sag.
Locate interior end-bay bracing only where indicated.

Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

Erection Tolerances: Maintain erection tolerances of structural framing within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

METAL PANEL INSTALLATION, GENERAL

General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
Install metal panels perpendicular to structural supports, unless otherwise indicated.
Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
Locate metal panel splices over, but not attached to, structural supports with end laps in alignment. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
Lap metal flashing over metal panels to allow moisture to run over and off the material.

Lap-Seam Metal Panels: Install screw fasteners with power tools having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads, or metal panels. Install screws in predrilled holes. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation.

Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal panel manufacturer.

METAL ROOF PANEL INSTALLATION

General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations. Install ridge caps as metal roof panel work proceeds.

Field-Assembled, Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.

Install clips to supports with self-tapping fasteners.
Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.
Provide metal closures at peaks, rake edges, rake walls, and each side of ridge caps.

Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

METAL WALL PANEL INSTALLATION

General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

When two rows of metal panels are required, lap panels 4 inches (102 mm) minimum.
When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
Install screw fasteners in predrilled holes.
Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated, or if not indicated, as necessary for waterproofing.
Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-tapping screws.
Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

Field-Assembled, Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

METAL SOFFIT PANEL INSTALLATION

Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing.
Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

THERMAL INSULATION INSTALLATION FOR FIELD-ASSEMBLED METAL PANELS

General: Install insulation concurrently with metal wall panel installation, in thickness indicated to cover entire wall, according to manufacturer's written instructions.

Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths with both sets of facing tabs sealed to provide a complete vapor retarder.

Blanket Roof Insulation: Comply with the following installation method:

Over-Framing Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing members. Hold in place by metal roof panels fastened to secondary framing.

Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing members. Hold in place by metal wall panels fastened to secondary framing.

Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

DOOR AND FRAME INSTALLATION

General: Seal perimeter of each door frame with elastomeric sealant used for metal wall panels.

Personnel Doors and Frames: Install doors and frames according to ANSI A250.8. Shim as necessary to comply with DHI A115.IG. Fit non-fire-rated doors accurately in their respective frames.

At fire-rated openings, install frames according to, and doors with clearances specified in, NFPA 80.

WINDOW INSTALLATION

Seal perimeter of each window frame with elastomeric sealant used for metal wall panels.

Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

Field Glazing: Comply with installation requirements in Division 8 Section "Glazing."

ACCESSORY INSTALLATION

General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

Install components for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection.

Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.

Windows: Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

FIELD QUALITY CONTROL

Testing Agency: Owner will engage a qualified testing and inspecting agency to perform the following tests and inspections and to submit reports.

Special Inspector: Owner will engage a qualified special inspector to perform the following tests and inspections and to submit reports.

Tests and Inspections:

High-Strength, Field-Bolted Connections: Connections shall be tested and inspected during installation according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

Welded Connections: In addition to visual inspection, field-welded connections shall be tested and inspected according to AWS D1.1.

CLEANING AND PROTECTION

Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.

Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or SSPC-SP 3, "Power Tool Cleaning."

Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION 13125

SECTION 13851 - FIRE ALARM

PART 1 - GENERAL

SUMMARY

This Section includes fire alarm systems with manual stations, detectors, signal equipment, controls, and devices.

System Description: Noncoded, zoned system with manual and automatic alarm initiation; hard-wired for signal transmission, using individual circuits for each zone of alarm initiation and notification appliances.

DEFINITIONS

FACP: Fire alarm control panel.

LED: Light-emitting diode.

Definitions in NFPA 72 apply to fire alarm terms used in this Section.

SUBMITTALS

Product Data: For each type of fire alarm system component.

Shop Drawings:

Wiring diagrams. Detail wiring for power, signal, and control systems.

Identify terminals, wire designations, and wiring color-codes to facilitate installation, operation, and maintenance.

Indicate recommended types and sizes for field-installed system wiring.

Battery sizing calculations.

QUALITY ASSURANCE

Installer Qualifications: A qualified Installer and service technician, approved by the manufacturer.

Source Limitations: Obtain fire alarm system components through one source from a single manufacturer.

Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

Comply with NFPA 72.

PART 2 - PRODUCTS

MANUFACTURERS

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

Cerberus Pyrotronics.
Edwards Systems Technology; Unit of General Signal.
Faraday, Inc.
Federal Signal Corp.; Commercial Products Group.
Fire Control Instruments, Inc.
Fire Lite Alarms, Inc.
Gamewell Co. (The).
Grinnell Fire Protection Systems.
Harrington Signal, Inc; Fire Alarm.
Honeywell, Inc.
Notifier; Div. of Pittway Corp.
Protectowire Co., Inc. (The).
Silent Knight.
Simplex Time Recorder Co.

FUNCTIONAL DESCRIPTION OF SYSTEM

System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.

Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one zone or device are not altered by subsequent alarm, supervisory, or trouble signals. Annunciate and display alarm, supervisory, and trouble signals regardless of priority or order received.

Noninterference: A signal on one zone shall not prevent the receipt of signals from other zones.

System Reset: Zones are manually resettable from the FACP after initiating devices are restored to normal.

System Alarm Capability during Circuit Fault Conditions: Comply with requirements of authorities having jurisdiction.

Loss of primary power at the FACP initiates a trouble signal at the FACP. The FACP indicate when the fire alarm system is operating on the secondary power supply.

Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a flame or heat detector, operation of a sprinkler flow device, or automatic alarm operation of a smoke, flame, or heat detector, or operation of a sprinkler flow device initiates the following:

Notification-appliance operation.
Identification at the FACP of the zone originating the alarm.

Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP.

Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.

Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.
When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.

Water-flow alarm switch operation initiates the following:

Notification-appliance operation.

Sprinkler valve-tamper switch operation initiates the following:

A supervisory, audible, and visible "valve-tamper" signal indication at the FACP and the annunciator.

MANUAL PULL STATIONS

Description: Fabricated of metal or plastic, and finished in red with molded, raised-letter operating instructions of contrasting color.

Single-action mechanism initiates an alarm.

Station Reset: Key or wrench operated; double pole, double throw; switch rated for the voltage and current at which it operates.

SMOKE DETECTORS

General features include the following:

Operating Voltage: 24-V dc, nominal.

Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

Plug-in Arrangement: Detector and associated electronic components are mounted in a module that connects in a tamper-resistant manner to a fixed base with a twist-locking plug connection. Terminals in the fixed base accept building wiring.

Integral Visual-Indicating Light: LED type. Indicates detector has operated.

Sensitivity: Can be tested and adjusted in-place after installation.

Photoelectric smoke detectors include the following features:

Ionization detector include the following features:

Responsive to both visible and invisible products of combustion.

Self-compensating for changes in environmental conditions.

OTHER DETECTORS

Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or rate of rise of temperature that exceeds 15 deg F (8.3 deg C) per minute, unless otherwise indicated.

NOTIFICATION APPLIANCES

Description: Equip for mounting as indicated and have screw terminals for system connections.

Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.

Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns produce a sound-pressure level of 90 dB, measured 10 feet (3 m) from the horn.

Visible Alarm Devices: Xenon strobe lights listed under UL 1971 with clear or nominal white polycarbonate lens. Mount lens on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

Rated Light Output: 15 candela.

Strobe Leads: Factory connected to screw terminals.

CENTRAL FACP

Cabinet: Lockable steel enclosure. Arrange interior components so operations required for testing or for normal maintenance of the system are performed from the front of the enclosure. If more than one unit is required to form a complete control panel, fabricate with matching modular unit enclosure to accommodate components and to allow ample gutter space for field wiring and interconnecting panels.

Identify each enclosure with an engraved, red, laminated, phenolic-resin nameplate with lettering not less than 1 inch (25 mm) high. Identify individual components and modules within cabinets with permanent labels.

Mounting: Flush.

Alarm and Supervisory Systems: Separate and independent in the FACP. Alarm-initiating zone boards consist of plug-in cards. Construction requiring removal of field wiring for module replacement is unacceptable.

Control Modules: Include types and capacities required to perform required functions of fire alarm systems.

Indications: Local, visible, and audible signals announce alarm, supervisory, and trouble conditions. Each type of audible alarm has a different sound.

Resetting Controls: Prevent the resetting of alarm, supervisory, or trouble signals while the alarm or trouble condition still exists.

EMERGENCY POWER SUPPLY

Battery Type: nickel-cadmium battery with a 20-year minimum life expectancy, charger, and an automatic transfer switch.

Battery Capacity: Comply with NFPA 72.

Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Provide capacity for 150 percent of the connected system load while maintaining batteries at full charge. If batteries are fully discharged, the charger recharges them completely within four hours. Charger output is supervised as part of system power supply supervision.

Integral Automatic Transfer Switch: Transfers the load to the battery without loss of signals or status indications when normal power fails.

WIRE

Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

Low-Voltage Circuits: No. 16 AWG, minimum.

Line-Voltage Circuits: No. 12 AWG, minimum.

Power-Limited Circuits: NFPA 70, Types FPL, FPLR, or FPLP, as recommended by manufacturer.

PART 3 - EXECUTION

EQUIPMENT INSTALLATION

Connect power to the FACP through a disconnect switch with lockable handle or cover.

Manual Pull Stations: Mount semiflush in recessed back boxes.

Water-Flow Detectors and Valve Supervisory Switches: Connect for each sprinkler valve station required to be supervised.

Ceiling-Mounted Smoke Detectors: Not less than 4 inches (100 mm) from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet (9 m) apart in any direction.

Wall-Mounted Smoke Detectors: At least 4 inches (100 mm), but not more than 12 inches (300 mm), below the ceiling.

Smoke Detectors near Air Registers: Install no closer than 60 inches (1520 mm).

Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Combine audible and visible alarms at the same location into a single unit.

Visible Alarm-Indicating Devices: Install at each alarm bell or alarm horn and elsewhere as indicated. Mount at least 6 inches (150 mm) below the ceiling.

FACP: Mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

WIRING INSTALLATION

Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceways and Boxes." Conceal raceway except in unfinished spaces and as indicated.

Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure.

Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers that are in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors or zones.

Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

IDENTIFICATION

Identify system components, wiring, cabling, and terminals according to Division 16 Section.

Paint power-supply disconnect switch red and label "FIRE ALARM."

GROUNDING

Ground cable shields and equipment according to system manufacturer's written instructions to minimize ground loops, common-mode returns, noise pickup, cross talk, false alarm signals, and other impairments.

Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.

Install grounding electrodes of type, size, location, and quantity as indicated. Comply with installation requirements in Division 16 Section "Grounding and Bonding."

FIELD QUALITY CONTROL

Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and connections, to supervise pretesting, and adjustment of the system and to assist in final system tests and demonstration.

Pretesting: Determine, through pretesting, the compliance of the system with requirements of Drawings and Specifications. Correct deficiencies observed in pretesting. Retest until satisfactory performance and conditions are achieved.

Final Test Notice: Provide a minimum of 10 days' notice in writing when the system is ready for final acceptance testing.

Minimum System Tests: Test the system according to procedures outlined in NFPA 72. Minimum required tests are as follows:

Verify the absence of unwanted voltages between circuit conductors and ground.

Test conductors for short circuits using an insulation-testing device.

With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.

Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.

Test initiating and indicating circuits for proper signal transmission under open circuit conditions.

One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.

Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.

Test the system for specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and remote annunciator indications. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.

Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets Specifications and complies with applicable standards.

Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log on the satisfactory completion of tests.

Tag equipment, stations, and other components at which tests have been satisfactorily completed.

DEMONSTRATION

Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, adjusting, and maintaining equipment. Provide a minimum of 8 hours' training.

Training Aid: Use the approved final version of the operation and maintenance manual as a training aid. Refer to requirements specified for maintenance manuals in Division 1.

Schedule training with Owner, through Architect, with at least seven days' advance notice.

ON-SITE ASSISTANCE

Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three requested visits to Project site for this purpose.

END OF SECTION13851

SECTION 13915 - FIRE-SUPPRESSION SYSTEM

PART 1 - GENERAL

SUMMARY

This Section includes the following fire-suppression piping inside the building:

Wet-pipe sprinkler systems.

See Division 13 Section "Fire Alarm" for alarm devices not specified in this Section.

SYSTEM DESCRIPTIONS

Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

PERFORMANCE REQUIREMENTS

Standard Piping System Component Working Pressure: Listed for at least 175 psig (1200 kPa).

Minimum Density for Automatic-Sprinkler Piping Design:

Light-Hazard Occupancy: 0.10 gpm/sq.ft. over 1500 sq. ft., 4.1 L/min. per sq. m over 139 sq. m or 4.1 mm/min. over 139 sq. m.

Seismic Performance: Fire-suppression piping shall be capable of withstanding the effects of earthquake motions determined according to NFPA 13 and ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

SUBMITTALS

Product Data: For each product indicated.

Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations, if applicable.

Field test reports and certificates.

Field quality-control test reports.

Operation and maintenance data.

QUALITY ASSURANCE

Installer Qualifications: Installer's responsibilities include designing, fabricating, and installing fire-suppression systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified sprinkler designer.

NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:

Town of Old Orchard Sprinkler Ordinance.

PART 2 - PRODUCTS

STEEL PIPE AND FITTINGS

Threaded-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, hot-dip galvanized where indicated and with factory- or field-formed threaded ends.

Cast-Iron Threaded Flanges: ASME B16.1.

Malleable-Iron Threaded Fittings: ASME B16.3.

Gray-Iron Threaded Fittings: ASME B16.4.

Steel Threaded Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, seamless steel pipe hot-dip galvanized where indicated. Include ends matching joining method.

Steel Threaded Couplings: ASTM A 865[hot-dip galvanized-steel pipe where indicated].

Grooved-End, Standard-Weight Steel Pipe: ASTM A 53/A 53M, ASTM A 135, or ASTM A 795, factory- or field-formed, roll-grooved ends.

Grooved-Joint Piping Systems:

Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.

Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, prelubricated rubber gasket listed for use with housing, and steel bolts and nuts.

FLEXIBLE CONNECTORS

Flexible connectors shall have materials suitable for system fluid. Include 175-psig (1200-kPa) minimum working-pressure rating and ends according to the following:

NPS 2 (DN 50) and Smaller: Threaded.

SPRINKLER SPECIALTY FITTINGS

Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig (1200-kPa) minimum working-pressure rating, and made of materials compatible with piping.

Outlet Specialty Fittings:

Mechanical-T and -Cross Fittings: UL 213, ductile-iron housing with gaskets, bolts and nuts, and threaded, locking-lug, or grooved outlets.

Snap-On and Strapless Outlet Fittings: UL 213, ductile-iron housing or casting with gasket and threaded outlet.

Sprinkler Drain and Alarm Test Fittings: Cast- or ductile-iron body; with threaded or locking-lug inlet and outlet, test valve, and orifice and sight glass.

Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.

Sprinkler Inspector's Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.

Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.

LISTED FIRE-PROTECTION VALVES

Valves shall be UL listed or FMG approved, with 175-psig (1200 kPa) minimum pressure rating.

Butterfly Valves: UL 1091.

NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.

NPS 2-1/2 (DN 65) and Larger: Bronze, cast-iron, or ductile-iron body; wafer type or with grooved ends.

Check Valves NPS 2 (DN 50) and Larger: UL 312, swing type, cast-iron body with flanged or grooved ends.

Gate Valves: UL 262, OS&Y type.

NPS 2 (DN 50) and Smaller: Bronze body with threaded ends.

NPS 2-1/2 (DN 65) and Larger: Cast-iron body with flanged ends.

Indicating Valves: UL 1091, with integral indicating device and ends matching connecting piping.

Indicator: Electrical, 115-V ac, prewired, 2-circuit, supervisory switch.

NPS 2 (DN 50) and Smaller: Ball or butterfly valve with bronze body and threaded ends.

NPS 2-1/2 (DN 65) and Larger: Butterfly valve with cast- or ductile-iron body; wafer type or with flanged or grooved ends.

UNLISTED GENERAL-DUTY VALVES

Check Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 4, Class 125 minimum, swing type with bronze body, nonmetallic disc, and threaded ends.

Gate Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, solid wedge, and threaded ends.

Globe Valves NPS 2 (DN 50) and Smaller: MSS SP-80, Type 2, Class 125 minimum, with bronze body, nonmetallic disc, and threaded ends.

SPECIALTY VALVES

Sprinkler System Control Valves: UL listed or FMG approved, cast- or ductile-iron body with flanged or grooved ends, and 175-psig (1200-kPa) minimum pressure rating.

Alarm Check Valves: UL 193, designed for horizontal or vertical installation, with bronze grooved seat with O-ring seals, single-hinge pin, and latch design. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, and fill-line attachment with strainer.

Drip Cup Assembly: Pipe drain with check valve to main drain piping.

Automatic Drain Valves: UL 1726, NPS 3/4 (DN 20), ball-check device with threaded ends.

SPRINKLERS

Sprinklers shall be UL listed or FMG approved, with 175-psig (1200-kPa) minimum pressure rating.

Automatic Sprinklers: With heat-responsive element complying with the following:

UL 1626, for residential applications.

Sprinkler Types and Categories: Nominal 1/2-inch (12.7-mm) orifice for "Ordinary" temperature classification rating, unless otherwise indicated or required by application.

Sprinkler types, features, and options as follows:

Flush ceiling sprinklers, including escutcheon.

Pendent sprinklers.

Sidewall sprinklers.

Upright sprinklers.

Sprinkler Finishes: Chrome plated, bronze, and painted.

Special Coatings: Wax, lead, and corrosion-resistant paint.

Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

Ceiling Mounting: Plastic, white finish, one piece, flat.

Sidewall Mounting: Plastic, white finish, one piece, flat.

FIRE DEPARTMENT CONNECTIONS

Wall-Type, Fire Department Connection: UL 405, 175-psig (1200-kPa) minimum pressure rating; with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, outlet with pipe threads, extension pipe nipples, check devices or clappers for inlets, and escutcheon plate with marking similar to "AUTO SPKR & STANDPIPE."

Type: Exposed, projecting, with two inlets and round escutcheon plate.

Finish: Polished chrome-plated.

ALARM DEVICES

Alarm-device types shall match piping and equipment connections.

Water-Motor-Operated Alarm: UL 753, mechanical-operation type with pelton-wheel operator with shaft length, bearings, and sleeve to suit wall construction and 10-inch- (250-mm-) diameter, cast-aluminum alarm gong with red-enamel factory finish. Include NPS 3/4 (DN 20) inlet and NPS 1 (DN 25) drain connections.

Water-Flow Indicator: UL 346, electrical-supervision, paddle-operated-type, water-flow detector with 250-psig (1725-kPa) pressure rating and designed for horizontal or vertical installation. Include two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

Valve Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled valve is in other than fully open position.

PRESSURE GAGES

Description: UL 393, 3-1/2- to 4-1/2-inch (90- to 115-mm-) diameter, dial pressure gage with range of 0 to 300 psig (0 to 2070 kPa).

Water System Piping: Include caption "WATER" or "AIR/WATER" on dial face.

PART 3 - EXECUTION

PIPING APPLICATIONS, GENERAL

Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with threaded ends; cast- or malleable-iron threaded fittings; and threaded joints.

Underground Service-Entrance Piping: Ductile-iron, grooved-end pipe and fittings; grooved-end-pipe couplings; and grooved joints.

SPRINKLER SYSTEM PIPING APPLICATIONS

NPS 1-1/2 (DN 40) and Smaller: Plain-end, black, standard-weight steel pipe; locking-lug fittings; and twist-locked joints.

NPS 2 (DN 50) and Larger: Grooved-end, black, standard-weight steel pipe; grooved-end fittings; grooved-end-pipe couplings; and grooved joints.

VALVE APPLICATIONS

Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

Listed Fire-Protection Valves: UL listed and FMG approved for applications where required by NFPA 13.

Shutoff Duty: Use butterfly or gate valves.

Unlisted General-Duty Valves: For applications where UL-listed and FMG-approved valves are not required by NFPA 13.

Shutoff Duty: Use butterfly or gate valves.

Throttling Duty: Use globe valves.

JOINT CONSTRUCTION

Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping joint construction.

Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe smaller than NPS 8 (DN 200) with wall thickness less than Schedule 40 unless approved by authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.

Twist-Locked Joints: Insert plain-end piping into locking-lug fitting and rotate retainer lug one-quarter turn.

Pressure-Sealed Joints: Use UL-listed tool and procedure. Include use of specific equipment, pressure-sealing tool, and accessories.

Grooved Joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.

Ductile-Iron Pipe: Radius-cut-groove ends of piping. Use grooved-end fittings and grooved-end-pipe couplings.

Steel Pipe: Square-cut or roll-groove piping as indicated. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.

SERVICE-ENTRANCE PIPING

Connect fire-suppression piping to water-service piping of size and in location indicated for service entrance to building.

Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping.

PIPING INSTALLATION

Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation.

Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.

Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

Install unions adjacent to each valve in pipes NPS 2 (DN 50) and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 (DN 65) and larger connections.

Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.

Install sprinkler piping with drains for complete system drainage.

Install sprinkler zone control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

Install drain valves on standpipes.

Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.

Install alarm devices in piping systems.

Hangers and Supports: Comply with NFPA 13 for hanger materials.

Install sprinkler system piping according to NFPA 13.

Earthquake Protection: Install piping according to NFPA 13 to protect from earthquake damage.

Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 (DN 8) and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

Fill wet-pipe sprinkler system piping with water.

VALVE INSTALLATION

Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.

Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water supply sources.

Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retarding chamber drain-line connection.

SPRINKLER APPLICATIONS

Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:

Rooms without Ceilings: Upright sprinklers.

Rooms with Ceilings: Flush sprinklers.

Wall Mounting: Sidewall sprinklers.

Sprinkler Finishes:

Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.

Concealed Sprinklers: Rough brass, with factory-painted white cover plate.

Flush Sprinklers: Bright chrome, with painted white escutcheon.

Residential Sprinklers: Dull chrome.

SPRINKLER INSTALLATION

Install sprinklers in ceilings.

Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

FIRE DEPARTMENT CONNECTION INSTALLATION

Install wall-type, fire department connections in vertical wall.

Install ball drip valve at each check valve for fire department connection.

CONNECTIONS

Drawings indicate general arrangement of piping, fittings, and specialties.

1 Install piping adjacent to equipment to allow service and maintenance.

2
3 Connect water-supply piping to fire-suppression piping. Include backflow preventer between potable-
4 water piping and fire-suppression piping.

5
6 Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside
7 building.

8
9 Connect piping to specialty valves, hose valves, specialties, fire department connections, and
10 accessories.

11
12 Electrical Connections: Power wiring is specified in Division 16.

13
14 Connect alarm devices to fire alarm.

15
16 Ground equipment according to Division 16 Section "Grounding and Bonding."

17
18 Connect wiring according to Division 16 Section "Conductors and Cables."

19
20
21 LABELING AND IDENTIFICATION

22
23 Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

24
25
26 FIELD QUALITY CONTROL

27
28 Perform the following field tests and inspections and prepare test reports:

29
30 Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no
31 leaks exist.

32 Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.

33 Coordinate with fire alarm tests. Operate as required.

34 Verify that equipment hose threads are same as local fire department equipment.

35
36 Report test results promptly and in writing to Architect and authorities having jurisdiction.

37
38
39 END OF SECTION 13915