

Sierra County Fairgrounds Improvements Project Manual



Sierra County
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Truth of Consequences, New Mexico 87901
(575) 894-6215 sierraco.org



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WCI File: 22 600 157 02

WILSON
& COMPANY

PROJECT MANUAL

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SECTION 00 4314
SUPPLEMENT J - BID BOND

BID BOND FORM

BID SECURITY, MADE PAYABLE TO THE OWNER IN THE AMOUNT OF 5 PERCENT OF THE BASE BID INCLUDING ALL COSTS FOR ALLOWANCES AND ALTERNATES, IF ANY, SHALL BE SUBMITTED WITH THE BID.

BID SECURITY SHALL BE IN THE FORM OF AIA A310 BID BOND ISSUED BY A SURETY LICENSED TO CONDUCT BUSINESS IN THE STATE OF NEW MEXICO.

SEE AIA DOCUMENT A310, BID BOND, FOLLOWING THIS DOCUMENT.

END OF SUPPLEMENT J



AIA[®] Document A310[™] – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Sierra County
1712 N. Date Street
Suite D
Truth or Consequences, NM 87901

BOND AMOUNT: \$**PROJECT:**

(Name, location or address, and Project number, if any)

County of Sierra Fairgrounds Improvements
2953 South Broadway
Truth or Consequences, NM 87901

ADDITIONS AND DELETIONS:

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such

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statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

(Witness)

(Witness)

(Contractor as Principal) (Seal)

(Title)

(Surety) (Seal)

(Title)



SECTION 00 4317
AGENTS AFFIDAVIT - BID BOND

THIS FORM MUST
BE USED BY SURETY

(TO BE FILLED IN BY AGENT)

STATE OF _____

ss.

COUNTY OF _____

_____, being first duly sworn, deposes and says
that he/she is the duly appointed agent for _____ and is
licensed in the State of New Mexico.

Deponent further states that a certain bond was given to indemnify
_____ in connection with the construction of
_____ dated the _____ day of
_____, 20____, executed by _____
Contractor, as principal, and _____, as surety, signed
by this Deponent; and Deponent further states that said bond was written, signed, and delivered by
him/her; that the premium on the same has been or will be collected by him/her; and that the full
commission thereon has been or will be retained by him/her.

Subscribed and sworn to before me, a notary public in and for the County
of _____, this _____ day of
_____, 20_____.

NOTARY PUBLIC:

My Commission Expires:

Agent's Address:

Telephone:

END OF SECTION

SECTION 00 4336
SUPPLEMENT A - LIST OF SUBCONTRACTORS

PARTICULARS

1.1 PROVIDE OWNER WITH LIST OF SUBCONTRACTORS AS A CONDITION OF THE BID.

- A. Submit complete List of Subcontractors with Bid as a condition of the Bid with regard to Subcontractors providing services valued at \$5,000 or more.
- B. Submit List of Subcontractors Owners's email address indicated in Section 01 1000 - Summary within 24 hours after the bid date.
- C. Expand List of Subcontractors after Bid by apparent low bidder, if awarded, and submit list to Owner before execution of the Contract, to include major Suppliers providing services valued at \$5,000 or more.
- D. Expand List of Subcontractors after Bid by apparent low bidder, if awarded and submit to before execution of the Contract, to include the State of New Mexico Department of Workforce Solutions labor enforcement fund registration number. See the Department of Workforce Solutions web site at www.dws.state.nm.us under "Public Works" for registration form, listings and information.
- E. Example trades and suppliers include, but are not limited to, roofing, insulation, hardware, plumbing, HVAC, electrical, and special systems.

1.2 HEREWITH IS THE LIST OF SUBCONTRACTORS REFERENCED IN THE BID SUBMITTED BY:

1.3 (BIDDER) _____

1.4 TO (OWNER): SIERRA COUNTY.

1.5 PROJECT NAME: SIERRA COUNTY FAIRGROUND IMPROVEMENTS

1.6 DATED _____ AND WHICH IS AN INTEGRAL PART OF THE BID FORM.

1.7 THE FOLLOWING WORK WILL BE PERFORMED (OR PROVIDED) BY SUBCONTRACTORS AND COORDINATED BY US:

LIST OF SUBCONTRACTORS FORM				
The undersigned agrees that any and all claims which the firm may have or may inure to it for overcharges resulting from antitrust violations as to goods, services, and materials purchased in connection with the above-referenced project are hereby assigned to the Owner, but only to the extent that such overcharges are passed on to the Owner. It is agreed that the firm retains all rights to any such antitrust claims to the extent of any overcharges not passed on to the District, including the right to any treble damages attributable thereto.				
Type of Work (not all types of work are	Entity Name	City and State	Labor Enforcement Fund	Signature (not required until after Bid, but before

listed. Bidder to complete)			Registration # (if over \$60,000)	Award)
Demolition				
Earthwork				
Site Utilities				
Concrete				
Structural Steel				
Carpentry				
Insulation				
Doors				
Gypsum Board				
Ceilings				
Flooring				
Painting				
Equipment				
Pre-engineered Buildings				
Plumbing				
Mechanical				
Electrical				

- 1.8 THE ABOVE LISTING MUST INCLUDE THE NAME, LOCATION OF PLACE OF BUSINESS AND CATEGORY OF WORK, WHICH WILL BE DONE BY EACH SUBCONTRACTOR ON THE LIST. LIST ONLY ONE SUBCONTRACTOR FOR EACH CATEGORY OF WORK. FAILURE TO COMPLY WITH THESE REQUIREMENTS WILL MAKE THE BID NON-RESPONSIVE AND THE BID WILL BE REJECTED

END OF SUPPLEMENT A

SECTION 00 6113
PERFORMANCE AND PAYMENT BOND FORM

PART 1 GENERAL

PERFORMANCE AND PAYMENT BOND FORM

THE PERFORMANCE AND PAYMENT BOND FORM TO BE EXECUTED IS ATTACHED FOLLOWING THIS PAGE.

MODIFICATIONS TO THE PERFORMANCE AND PAYMENT BOND FORM

Payment Bond: Change paragraph §7.1 to read as follows:

7.1 Send an answer to the Claimant, with a copy to the Owner, within forty-five (45) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



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Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Sierra County
1712 N. Date Street
Suite D
Truth or Consequences, NM 87901

CONSTRUCTION CONTRACT

Date:

Amount: \$ 0.00

Description:

(Name and location)

County of Sierra Fairgrounds Improvements
2953 South Broadway
Truth or Consequences, NM 87901

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

Signature: _____

Name and

Title:

(Any additional signatures appear on the last page of this Performance Bond.)

SURETY

Company: (Corporate Seal)

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

1712 N. Date Street
Suite D
Truth or Consequences, NM 87901
Telephone Number: (575) 894-6215

Email Address:

ADDITIONS AND DELETIONS:

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____
(Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

SURETY

Company: _____
(Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____



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Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

Sierra County
1712 N. Date Street
Suite D
Truth or Consequences, NM 87901

CONSTRUCTION CONTRACT

Date:

Amount: \$ 0.00

Description:

(Name and location)

County of Sierra Fairgrounds Improvements
2953 South Broadway
Truth or Consequences, NM 87901

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature: _____

Name and

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:**OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:)

1712 N. Date Street
Suite D
Truth or Consequences, NM 87901
Telephone Number: (575) 894-6215

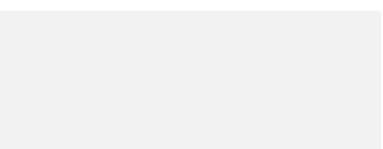
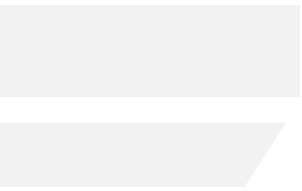
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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

Email Address:



Init.
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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

SECTION 00 6129
AGENT'S AFFIDAVIT - CONSTRUCTION CONTRACT BONDS

(To be filled in by Agent)

STATE OF _____)

SS.

COUNTY OF _____)

_____, being first duly sworn, deposes and says
that he/she is the duly appointed agent
for _____ and is licensed in the State of
New Mexico.

Deponent further states that a certain bond was given to indemnify _____ in connection
with the construction of _____ project dated the _____ day
of _____, 20____, executed by _____,
Contractor, as principal, and _____, as surety, signed by this
Deponent; and Deponent further states that said bond was written, signed, and delivered by
him/her; that the premium on the same has been or will be collected by him/her; and that the full
commission thereon has been or will be retained by him/her.

Subscribed and sworn to before me, a notary public in and for the County of
_____, this _____ day of _____, 20____.

Notary Public

My Commission Expires:

AGENT'S ADDRESS: _____

TELEPHONE: _____

END OF SECTION

(This page intentionally left blank)

SECTION 00 6216
CERTIFICATE OF INSURANCE FORM

PART 1 GENERAL

CERTIFICATE OF INSURANCE FORM

THE CERTIFICATE OF INSURANCE FORM TO BE EXECUTED IS ATTACHED FOLLOWING THIS PAGE.

AIA G715 SUPPLEMENTAL ATTACHMENT FOR ACORD CERTIFICATE OF INSURANCE 25-S TO BE EXECUTED IS ATTACHED FOLLOWING THE CERTIFICATE OF INSURANCE FORM.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Broker's Name and Address	CONTACT NAME:	
	PHONE (A/C, No. Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED Insured's Name and Address	INSURER A:	
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	
	INSURER F:	

COVERAGES**CERTIFICATE NUMBER:****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC <input type="checkbox"/> OTHER:			Sample			EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000 \$
	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY			Sample			COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> DED <input checked="" type="checkbox"/> RETENTION \$						EACH OCCURRENCE \$ 1,000,000 AGGREGATE \$ \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N <input type="checkbox"/>	N/A	Sample			<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Name and Address of Owner

CERTIFICATE HOLDER**CANCELLATION**

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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ACORD 25 (2016/03)

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CERTIFICATE OF INSURANCE

00 6216-2



AIA[®] Document G715[™] – 2017

Supplemental Attachment for ACORD Certificate of Insurance 25

PROJECT: <i>(name and address)</i> County of Sierra Fairgrounds Improvements 2953 South Broadway Truth or Consequences, NM 87901	CONTRACT INFORMATION: Contract For: General Construction Date:	CERTIFICATE INFORMATION: Producer: Insured: Date:
OWNER: <i>(name and address)</i> Sierra County 1712 N. Date Street Suite D Truth or Consequences, NM 87901	ARCHITECT: <i>(name and address)</i> Wilson & Company, Inc., Engineers & Architects 414 N. Main St. Las Cruces, NM 88001	CONTRACTOR: <i>(name and address)</i>

A. General Liability		Yes	No	N/A
1.	Does this policy include coverage for:			
a	Damages because of bodily injury, sickness, or disease, including occupational sickness or disease, and death of any person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b	Personal injury and advertising injury?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c	Damages because of physical damage to or destruction of tangible property, including the loss of use of such property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d	Bodily injury or property damage arising out of completed operations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e	The Contractor's indemnity obligations included in the Contract Documents?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Does this policy contain an exclusion or restriction of coverage for:			
a	Claims by one insured against another insured, where the exclusion or restrictions is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b	Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c	Claims for bodily injury other than to employees of the insured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d	Claims for the Contractor's indemnity obligations included in the Contract Documents arising out of injury to employees of the insured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e	Claims for loss excluded under a prior work endorsement or other similar exclusionary language?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f	Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g	Claims related to residential, multi-family, or other habitational projects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h	Claims related to roofing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i	Claims related to exterior insulation finish systems, synthetic stucco, or similar exterior coatings or surfaces?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j	Claims related to earth subsistence or movement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k	Claims related to explosion, collapse, and underground hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Other Insurance Coverage		Yes	No	N/A
1.	Indicate whether the Contractor has the following insurance coverages and, if so, indicate the coverage limits for each.			
a	Professional liability insurance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Coverage limits:
- b** Pollution liability insurance ☐ ☐ ☐
- Coverage limits:
- c** Insurance for maritime liability risks associated with the operation of a vessel ☐ ☐ ☐
- Coverage limits:
- d** Insurance for the use or operation of manned or unmanned aircraft ☐ ☐ ☐
- Coverage limits:
- e** Property insurance ☐ ☐ ☐
- Coverage limits:
- f** Railroad protective liability insurance ☐ ☐ ☐
- Coverage limits:
- g** Asbestos abatement liability insurance ☐ ☐ ☐
- Coverage limits:
- h** Insurance for physical damage to property while it is in storage and in transit to the construction site ☐ ☐ ☐
- Coverage limits:
- i** Other: ☐ ☐ ☐

(Authorized Representative)

(Date of Issue)

SECTION 00 6313
REQUEST FOR INTERPRETATION FORM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Request for Interpretation (RFI) requirements.
- B. Request for Interpretation form.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Requests for Interpretation must be submitted on the Architect's Request for Interpretation Form.
 - 1. A copy of the Architect's Request for Interpretation Form follows this document.
 - 2. Electronic versions of this form will be made available to the Contractor by the Architect.
 - 3. The Contractor's RFI form may be used upon approval from the Architect.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 RFI SUBMITTALS

- A. RFI Submittals: Comply with requirements identified in Section 01 3000 - Administrative Requirements.
- B. The Architect will respond to requests for contract interpretations with reasonable promptness.
- C. It is acknowledged and understood that some RFIs will take longer to answer than others.
- D. The Architect's response is not an authorization to proceed with any work requiring changes to the Contract sum and/or Contract time.
- E. If the Architect's response will result in a change to the Contract sum and/or the Contract time identified in the Contract Documents, notify the Architect immediately.
 - 1. Responses requiring a change to the Contract sum or Contract time must be executed by Change Order or Construction Change Directive in accordance with the Contract Documents prior to proceeding with the work.
- F. Substitution Requests: Do not use RFI forms for substitution requests.

3.2 REQUEST FOR INTERPRETATION (RFI) FORM

- A. The form to be used for requesting information and/or interpretations of the contract documents is attached on the following page.
 - 1. Fully describe the question or type of information requested; and include recommendations for solutions where indicated on the form.
- B. An electronic version of the RFI Form will be provided to the Contractor for use during the project.

- C. An electronic version of the Contractor's RFI form may be used upon approval from the Architect.
 - 1. Contractor's RFI form must be formatted to include content of Architect's RFI form.
 - 2. Submit an electronic sample of the Contractor's RFI form to the Architect for approval prior to submitting RFIs for the project.

END OF SECTION

RFI Number: 001

REQUEST FOR INTERPRETATION

Project: Sierra County Fairgrounds Improvements
2953 South Broadway
Truth or Consequences, NM 87901

From: Contractor Name
Contractor Address Line 1
Contractor Address Line 2

To: Wilson & Company, Inc., Engineers & Architects
3801B Constitution Dr, Suite 300, El Paso, TX 79922
ATTN: Louis Edwards, RA

Initiated By: _____

Date Submitted: _____

WCI Project Number: 22-600-157-02

Description (fully describe question or type of information requested below):

Contractor's Recommendation (provide recommended solution, including cost or schedule considerations below):

Contractor's References/Attachments:

Specification Section _____, Paragraph _____

Sheet: _____, Detail: _____

Wilson & Company's Response (provide below):

Response Date: DD-MMM-YY

Response By: _____

Attachments ☐

Note: This reply is not an authorization to proceed with work involving additional cost and/or time. Responses requiring a change to the Contract sum or Contract time must be executed by Change Order or Construction Change Directive in accordance with the Contract Documents prior to proceeding with the work.

WILSON
& COMPANY

SECTION 00 7200
GENERAL CONDITIONS

FORM OF GENERAL CONDITIONS

THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED
FOLLOWING THIS PAGE.

RELATED REQUIREMENTS

SECTION 00 7300 - SUPPLEMENTARY CONDITIONS.

SECTION 01 4216 - DEFINITIONS.

SUPPLEMENTARY CONDITIONS

REFER TO DOCUMENT 00 7300 - SUPPLEMENTARY CONDITIONS FOR AMENDMENTS TO
THESE GENERAL CONDITIONS.

END OF DOCUMENT

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AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

County of Sierra Fairgrounds Improvements
2953 South Broadway
Truth or Consequences, NM 87901

THE OWNER:

(Name, legal status and address)

Sierra County
1712 N. Date Street
Suite D
Truth or Consequences, NM 87901

THE ARCHITECT:

(Name, legal status and address)

Wilson & Company, Inc., Engineers & Architects
414 N. Main St.
Las Cruces, NM 88001

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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User Notes:

(1668965720)

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES



Init.

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User Notes:

(1668965720)

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These

obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional,

whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work,

provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;

- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities

proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the

procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and

approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1** damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2** damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

SECTION 00 7300
SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

1.1 SUMMARY

- A. These Supplementary Conditions amend and supplement the General Conditions and other provisions of Contract Documents as indicated below. Provisions that are not so amended or supplemented remain in full force and effect.
- B. The terms used in these Supplementary Conditions that are defined in the General Conditions have the meanings assigned to them in the General Conditions.

1.2 RELATED SECTIONS

- A. Section 00 7200 - General Conditions.
- B. Section 01 4216 - Definitions.

1.3 MODIFICATIONS TO GENERAL CONDITIONS

A. ARTICLE 3 CONTRACTOR

- 1. Add the following after Article 3.2.2:
 - 3.2.2.1** Submit RFIs to Architect on the Request for Interpretation Form included in Specification Section 00 6313 - Request for Interpretation Form.
- 2. Replace Article 3.4.2 with the following:
 - 3.4.2** Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Owner will not consider requests for substitutions after date of the Agreement except as follows:
 - 3.4.2.1** Substitutions must be submitted in accordance with provisions identified in Section 01 6000 - Product Requirements.
- 3. Add the following after Article 3.7.1:
 - 3.7.1.1** Fees required for meters, impact fees, and utility connections, if any, will be secured and paid by the Contractor.

B. ARTICLE 8 TIME

- 1. Add the following after Article 8.2.3:
 - 8.2.3.1** The Owner will suffer financial loss if the Project is not completed as specified within the following number of calendar days from the date of issuance of the Notice to Proceed. The Contractor (and the Contractor's Surety) shall be liable for and shall pay to the Owner, not as a penalty but as liquidated damages, the amount hereinafter stipulated for each calendar day of delay until the Work in each phase is Substantially Complete: Five hundred dollars (\$500) per calendar day. Work phases: Refer to Section 01 1000 - Summary.
 - 8.2.3.1.1** Completion of Work: September 26, 2025.

C. ARTICLE 9 PAYMENTS AND COMPLETION

- 1. Add the following after Article 9.10.3:
 - a. **9.10.3.1** Prior to submitting final payment submit Consent of Surety to Final Payment Form to Owner.

D. ARTICLE 13 MISCELLANEOUS PROVISIONS

1. Add the following after Article 13.5:

13.6 Minimum Wage Rate Determinations: This project is subject to New Mexico State Wage Rates.

13.6.1 A copy of the New Mexico State Minimum Wage Rate Determinations follows this document.

13.7 Any Contractor or subcontractor that submits a bid valued at more than sixty thousand dollars (\$60,000.00) for this work, or portion(s) of this work, must be registered with the Labor and Industrial Division of the New Mexico Labor Department; All tiers of subcontractors are subject to this requirement.

13.8 Notice is given that in addition to the requirements of the General Conditions of the Contract, Non-Resident Contractors shall comply with provisions of Sections 52-1-66; 59A-17-10.1; 59A-18-1; and 59A-18-12 NMSA 1978, pertaining to the worker's compensation insurance policy and rate for employers not domiciled in New Mexico.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF DOCUMENT

SECTION 01 1000
SUMMARY

PART 1 GENERAL

1.1PROJECT

- A. Project Name: Sierra County Fairground Improvements.
- B. Owner's Name: County of Sierra.
 - 1. Owner's Business Address: 1712 North Date, Suite D, Truth or Consequences, New Mexico 87901.
 - 2. Isaac Rivers, (575) 952-2025, irivers@sierraco.org
- C. Architect's Name: Wilson & Company, Inc., Engineers & Architects, Inc..
 - 1. Business Address: 414 North Main Street, Las Cruces, New Mexico 88001.
- D. Architect's Email Address: louis.edwards@wilsonco.com.
- E. The Project includes new construction, building expansion, and building renovations as indicated in the Contract Documents.

1.2 CONTRACT DESCRIPTION

- A. The Contractor will be required to coordinate and schedule the Work with other work being performed by one or more Owner's contractors that will contract directly with the Owner.
 - 1. Other work being performed by Owner's contractors includes, but is not be limited to, the following:
 - a. Weatherization Improvements to the Event Barn.
- B. Coordinate and schedule the Work with Owner's contractors:
 - 1. Notify the Owner's contractors no later than 24 hours in advance regarding anticipated change in the installation schedule due to prediction of circumstances, including those directly caused by installer, which will prevent Owner's contractors from completing their work in accordance with the Project Schedule.
 - 2. Lack of adequate communication between Contractor and Owner's contractor's workforce regarding anticipated scheduling shall not relieve Contractor of this requirement.
 - 3. Contractor's lack of compliance with these requirements will result in Contractor reimbursing Owner related costs of Owner's separate contractor services.
 - a. Examples of such expenses are repeat trips and overtime made necessary by lack of Contractor's compliance with this requirement.
- C. The Contractor will be required to provide Owner with photocopies of Contractor's and all sub-contractor's current contracting licenses prior to execution of the contract.

1.3 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is indicated on drawings.
- B. Scope of alterations work is indicated on drawings.
- C. Salvaged Items: Contractor shall remove and deliver (remove and salvage) certain items to Owner.
 - 1. Salvaged items include the following:

- a. Above Ground Water Cisterns
2. Evaporative Cooler units mounted on Event Barn.
3. Location to deliver salvaged items to Owner: As directed by Owner to Owner's on-site storage location.
4. Comply with requirements of Section 02 4100 - Demolition.

1.4 WORK BY OWNER

- A. Owner will furnish and install certain products and/or materials for installation by the Owner.
 1. Owner-furnished, Owner-installed products: Refer to Section 01 6400 - Owner-Furnished Products.
- B. Cooperate with Owner to minimize conflict with work being supplied and installed by Owner.

1.5 OWNER OCCUPANCY

- A. Owner intends to continue to occupy adjacent portions of the building during the entire construction period.
- B. Owner intends to occupy the Project upon Substantial Completion.
- C. Owner intends to occupy Event Barn and East Parking Lot prior to the completion date for private events listed below;
 1. February 27, 2024 through March 4, 2024.
 2. April 21, 2024 through April 27, 2024.
- D. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- E. Schedule the Work to accommodate Owner occupancy.

1.6 CONTRACTOR USE OF SITE

- A. Arrange use of site to allow:
 1. Owner occupancy.
 2. Use of site by the public.
- B. Provide access to and from site as required by law and by Owner:
 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Time Restrictions: Construction hours are not restricted.
- D. Limitations on especially noisy work: Refer to Section 01 7000.
- E. Utility Outages and Shutdown:
 1. Limit shutdown of utility services to 2 hours at a time, arranged at least 24 hours in advance with Owner.
 2. Prevent accidental disruption of utility services to other facilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2000
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Correlation of Contractor submittals based on changes.
- E. Procedures for preparation and submittal of application for final payment.

1.2 SCHEDULE OF VALUES

- A. Form to be used: AIA G703.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values format electronically for Architect's approval within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization, bonds and insurance, and temporary facilities and controls.
- F. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- G. Transmit to Architect electronically, via email, in PDF format for Architect's review within 15 days after execution of contract; Refer to Section 01 1000 - Summary for Architect's email address.
 - 1. Create PDFs at native size and right-side up; illegible files will be rejected.
 - 2. If required, an electronically-marked up file will be returned.
 - 3. Paper document submittals will not be reviewed.
- H. Revise schedule to list separate line item for each approved Change Order with each Application For Payment.

1.3 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Form to be used: AIA G702 and G703.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. Include Owner's Contract Number and Project Number on the Form.
- F. For each item, provide a column for listing each of the following:

1. Item Number.
 2. Description of work.
 3. Scheduled Values.
 4. Previous Applications.
 5. Work in Place and Stored Materials under this Application.
 6. Authorized Change Orders.
 7. Total Completed and Stored to Date of Application.
 8. Percentage of Completion.
 9. Balance to Finish.
 10. Documentation and Project Close-Out.
- G. Execute certification by signature of authorized officer.
- H. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- I. Include the cost that is associated with coordination and scheduling of the Work with work being performed by Owner as identified in Section 01 6400 - Owner-Furnished Products.
- J. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- K. List each authorized Allowance as a separate line item, listing Allowance number and dollar amount specified in Section 01 2100, as for an original item of Work.
- L. List each authorized Alternate as a separate line item, listing Alternate number and dollar amount specified in Section 01 2300, as for an original item of Work.
- M. Include an individual line item in the Schedule of Values entitled, "Documentation and Project Close-Out" to provide a value consistent with and appropriate to required documentation provisions throughout the Contract.
1. List the value of the "Documentation and Project Closeout" item as determined by a direct proportional amount from each line item in the Schedule of Values.
 2. The value of the Documentation and Close-Out line item shall not be less than the following:

For Total Contract Amount (excluding tax) of:	Documentation and Close-Out Amount:
Less than \$20,000	\$0
\$20,001 - \$75,000	\$6,000
\$75,001 - \$100,000	\$8,000
\$100,001 - \$200,000	\$10,000
\$200,001 - \$350,000	\$15,000
\$350,001 - \$500,000	\$25,000
\$500,001 - \$1,000,000	\$50,000
\$1,000,001 - \$1,500,000	\$70,000
\$1,500,001 - \$2,000,000	\$90,000
\$2,000,001 - \$3,000,000	\$120,000
for each additional million	add \$30,000

3. If requested in writing by the Contractor, and in the sole opinion of the Owner, the Contractor is in full compliance with the documentation requirements of the Contract, the

Documentation and Close-Out Schedule of Value line item may be reduced each month prior to Substantial Completion up to five percent (5%) of the originally scheduled amount or one thousand dollars (\$1,000), whichever is greater, providing that the Documentation and Close-Out line item is not reduced to less than fifty percent (50%) of the original amount required until Close-Out is complete.

- N. Submit one copy of each Application for Payment to Architect electronically, via email, in PDF format; Refer to Section 01 10000 for Architect's email address.
 - 1. Create PDFs at native size and right-side up; illegible files will be rejected.
 - 2. An electronically-signed file will be returned.
 - 3. Paper document submittals will not be reviewed.
- O. Include the following with the application, in electronic format:
 - 1. Construction progress schedule, revised and current as specified in Section 01 3216.
 - 2. Current construction photographs specified in Section 01 3000.
 - 3. Submittal schedule specified in Section 01 3000.
 - 4. Affidavits attesting to off-site stored products.
- P. When Architect requires substantiating information, submit data justifying dollar amounts in question.
- Q. Incomplete applications will be returned to Contractor for resubmittal.

1.4 MODIFICATION PROCEDURES

- A. Submit name of the individual authorized to receive change documents and who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.
- B. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- C. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 7 days.
- E. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors.
- F. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 - 1. Amount will be based on Contractor's price quotation, in accordance with fixed percentage mark-ups for general administration, overhead, supervision, project insurance, and profit indicated in the Supplementary Conditions.

2. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 3. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
 4. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
 5. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- G. Substantiation of Costs: Provide full information required for evaluation.
1. On request, Provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- I. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- J. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- K. Promptly enter changes in Project Record Documents.

1.5 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 1. All closeout procedures specified in Section 01 7000.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2100
ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances.
- B. Payment and modification procedures relating to allowances.

1.2 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Refer to Section 00 7200 - General Conditions and 00 7300 - Supplementary Conditions.
- B. Architect Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products, suppliers , and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order.
- C. Contractor Responsibilities:
 - 1. Assist Architect in selection of products, suppliers , and installers.
 - 2. Obtain proposals from suppliers and installers and offer recommendations.
 - 3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
- D. Differences in costs will be adjusted by Change Order.

1.3 ALLOWANCES SCHEDULE

- A. Allowance No. 1 - Facility Improvements: Include the stipulated sum of \$10,000.00 for use for facility improvements upon Owner's instructions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2300
ALTERNATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description of Alternates.
- B. Alternate submission procedures.
- C. Documentation of changes to Contract Sum and Contract Time.

1.2 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Consider all work that must be accomplished for complete incorporation of alternates including modifications to Base Bid items.
- B. Include in lump sum prices for alternates all costs of labor, materials, equipment, permits, fees, insurance, bonds, overhead, and profit.
- C. Immediately after award of Sub-Contracts, advise all necessary personnel and suppliers as to which Alternates have been selected by Owner. Use all means necessary to alert those personnel and suppliers involved as to all changes in the work caused by Owner's selection or rejection of Alternates.
- D. Coordinate related work and modify surrounding work to integrate work of each Alternate.

1.4 SCHEDULE OF ALTERNATES

- A. Alternate Number 1 - Multi-Purpose Facility:
 - 1. Alternate Item:
 - a. Multi-Purpose Facility.
 - 2. Reference documents include, but are not limited to, the following:
 - a. Pre-Fabricated Metal Building: Specification Section 13 3419 - Metal Building Systems.
 - b. Utilities servicing the Multi-Purpose Facility.
 - c. Security Gates and Barriers: Specification Section 32 3136.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 2500 SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.2 DEFINITIONS

- A. Bidder: Refer to Section 01 4216 - Definitions.
- B. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - 2. Limitations: Refer to Section 01 6000 - Product Requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. Forms included in the Project Manual are adequate for this purpose, and must be used.
- D. Limit each request to a single proposed substitution item.

3.2 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:
 - 1. Owner will consider requests for substitutions only if submitted at least 10 days prior to the date for receipt of bids.

- B. Submittal Form (before award of contract):
 - 1. Submit substitution requests by completing the form attached to this section. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- C. Owner will only consider requests from Bidders for substitutions.
 - 1. Submit substitution requests in accordance with procedures and time limitations stated in Section 01 6000 - Product Requirements.

3.3 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. After signing of Agreement Between Owner and Contractor, the Owner will only consider substitution requests under the conditions stated in Section 01 6000 - Product Requirements.

3.4 SUBSTITUTION REQUEST SUBMITTALS

- A. Submit separate request for each substitution with Contractor Substitution Request Form included in 01 2501 - Substitution Request Form. Provide Contractor's data documenting need for substitution and substantiating compliance of proposed product with Contract Documents. Include proposed changes to contract amount and time if substitution is accepted.
- B. Submit Substitution Request Forms to Architect electronically, in accordance with Section 01 2501 - Substitution Request Form.

3.5 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

3.6 ACCEPTANCE

- A. Substitutions During Procurement:
 - 1. Accepted substitutions will be documented and incorporated into the Procurement Documents by Addendum.
 - 2. Use product specified if Architect does not issue a decision on use of a proposed substitution by Addendum.
- B. Substitutions During Construction:
 - 1. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.7 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

3.8 ATTACHMENTS

- A. The Substitution Request Form (Section 01 2501) required to be used on the Project is included after this section.

END OF SECTION

SECTION 01 2501
SUBSTITUTION REQUEST FORM

PROJECT NAME: _____

PROPOSED SUBSTITUTION:

PRODUCT: _____

Manufacturer: _____

Trade Name: _____

Model Number: _____

Manufacturer's Address: _____

Manufacturer's Phone: _____

Representative's Name: _____

Representative's Address: _____

Representative's Phone: _____

THE ABOVE PRODUCT WOULD BE USED IN LIEU OF:

Product: _____ specified in Section
Number _____

Specification Title: _____

Page: _____ Article/Paragraph: _____

Substitution History (select one):

___ New Product ___ 1-4 Years Old ___ 5-10 Years Old ___ > 10 Years Old

Differences between Substitution and Specified Product: _____

THE FOLLOWING ITEMS ARE ATTACHED:

___ Product description including specifications, performance and test data, and applicable reference standards.

___ Drawings.

___ Photographs.

___ Samples.

___ Tabulated comparison with specified product.

___ For items requiring color selections, full range of manufacturer's color samples.

___ Documentation of reason for request.

___ Cost data for comparing proposed substitution with specified product.

____ Other attachments as follows:

CERTIFICATION

Response to the following statements is required. Explanations for items which are not true must be attached.

Substitution has been thoroughly investigated and to confirm function, appearance, and quality meet or exceed that of specified product.

____ True ____ False

Warranty for Substitution is equal to or better than specified product.

____ True ____ False

No aspect of Project will require re-design.

____ True ____ False

Use of Substitution will not adversely affect dimensions shown on Drawings.

____ True ____ False

Maintenance service and replacement parts for Substitution are readily available in the following locations (select location(s) indicated and/or provide other locations):

____ Bernalillo County, NM

____ Dona Ana County County, NM

(other): _____

(other): _____

____ True ____ False

Substitution does not contain added formaldehyde, chlorofluorocarbons (CFCs), hydrochloroflourocarbons (HCFCs), lead, cadmium, or asbestos.

____ True ____ False

Use of Substitution will not adversely affect construction schedule and date of completion.

____ True ____ False

Use of Substitution will not adversely affect work of other trades.

____ True ____ False

Changes to Contract Sum related to use of Substitution are included in price listed below. Contractor waives claims for additional costs related to acceptance of Substitution which may subsequently become apparent.

____ True ____ False

Costs of modifying project design caused by use of proposed substitution which subsequently become apparent will be paid for by Contractor.

____ True ____ False

If this Substitution Request is accepted:

The Contract Sum(select one of the following):

____ will not be affected.

____ will be decreased by \$ _____.

____ will be increased by \$ _____.

The Contract Time (select one of the following):

____ will not be affected.

_____ will be decreased by _____ calendar days.
_____ will be increased by _____ calendar days.

This Substitution Request Form is being Submitted by (select one of the following):

_____ a Bidder, as defined in Section 01 2500 and whose contact information for the authorized person submitting this Request is included with electronic correspondence attached to this form.

_____ the Contractor, after signing of Agreement Between Owner and Contractor.

Date: _____.

EXECUTION:

Submit form to Architect in accordance with Section 01 2500 - Substitution Procedures.

Submit Substitution Request Forms to the Architect electronically by converting Substitution Request Form and other data into a single Portable Document Format (PDF) file less than 10 Mb in size, and submit to the Architect's email address indicated in Section 01 1000 - Summary.

File sizes larger than 10 Mb will be rejected by Architect's email firewall and will not be acknowledged, reviewed, or returned.

Substitution Request Forms submitted to email addresses other than the Architect's email address identified in Section 01 1000 - Summary will not be acknowledged, reviewed, or returned.

END OF SUBSTITUTION REQUEST FORM

SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General administrative requirements.
- B. Progress meetings.
- C. Progress photographs.
- D. Requests for Interpretation (RFI) procedures.
- E. Submittal procedures.

1.2 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

1.3 SUBMITTALS

- A. Contractor's Personnel List: Prior to the Pre-Construction Conference, submit a list of Contractor's principal staff assignments for Project.
 - 1. Indicate names, duties and responsibilities, addresses, emergency contact information and telephone numbers.
 - a. Identify the individual(s) in Contractor's employ authorized to approve changes to Contract Documents.
 - b. Identify the individual(s) who will be responsible for informing others in Contractor's employ or subcontractors of changes to Contract Documents.
 - 2. Include resume of proposed Project Superintendent showing prior experience as superintendent on projects of similar size and scope.
 - 3. Naming more than one Project Superintendent to be in charge depending which is present at the site is not be acceptable.
 - 4. Notify Architect prior to any proposed change in Project Superintendent during the progress of the Work.

- B. Submittal Schedule: Provide Owner with submittal schedule within ten days of execution of the Contract.
 - 1. Provide submittal schedule in accordance with Section 00 7200 - General Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONSTRUCTION MANAGEMENT SOFTWARE

- A. General: The Owner and the Architect will not be required to use Contractor's web-based or other construction management software for correspondence, submittals, RFIs, and other construction-related documents and communications.

3.2 PRECONSTRUCTION MEETING

- A. Owner will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
 - 4. Major subcontractors.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Distribution of Contract Documents.
 - 4. Submission of list of subcontractors, schedule of values, and progress schedule.
 - 5. Submission of initial Submittal schedule.
 - 6. Designation of personnel representing the parties to Contract and <1|A/E|>.
 - 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, change orders, and contract closeout procedures.
 - 8. Scheduling.

3.3 SITE MOBILIZATION MEETING

- A. Schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- C. Agenda:
 - 1. Use of premises by Owner and Contractor.
 - 2. Owner's requirements.
 - 3. Site Mobilization Plan.
 - a. Submit site mobilization plan for Owner's approval prior to start of Work.

- b. Update as necessary during progress of Work to adjust for changed conditions and as approved by Owner.
- 4. Owner's requirements .
- 5. On-site location of stored materials.
- 6. Site access and parking.
- 7. Compliance with Owner's security requirements.
- 8. Temporary utilities provided by Contractor.
- 9. Survey and site layout.
- 10. Security and housekeeping procedures.
- 11. Schedules.
- 12. Application for payment procedures.
- 13. Procedures for testing.
- 14. Procedures for maintaining record documents.
- 15. Requirements for start-up of equipment.
- 16. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Safety updates and improvements.
 - 5. Identification of problems that impede, or will impede, planned progress.
 - 6. Review of submittals schedule and status of submittals.
 - 7. Review of RFIs log and status of responses.
 - 8. Review of off-site fabrication and delivery schedules.
 - 9. Maintenance of progress schedule.
 - a. Document status of progress schedule (ahead of schedule, on schedule, or behind schedule).
 - 10. Corrective measures to regain projected schedule.
 - 11. Planned progress during succeeding work period.
 - 12. Coordination of projected progress.
 - 13. Maintenance of quality and work standards.
 - 14. Review and status of Architect's Supplemental Instructions.
 - 15. Review and status of modifications to the Contract.

16. Effect of proposed changes on progress schedule and coordination.
17. Review and status of Contractor's applications for payment.
18. Other business relating to work.

E. Record minutes and distribute copies within ten days after meeting to participants, with electronic copies to Architect, Owner, participants, and those affected by decisions made.

3.5 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 3216

3.6 PROGRESS PHOTOGRAPHS

- A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.
- B. Photograph Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Architect.
 1. Take photographs with maximum depth of field and in focus.
 2. Quantity: Provide a minimum of 20 photographs weekly. Select vantage points to show status of construction and progress since last photographs were taken.
 3. Provide additional photographs within 24 hours of Architect's request for the following events:
 - a. Special events planned at site.
 - b. Events that result in construction damage or losses.
 4. Restrictions: Refer to Section 01 3553 - Security Procedures.
- D. Concealed Work: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
 1. Underground site utilities.
- E. In addition to periodic, recurring views, take photographs of each of the following events:
 1. Demolition in progress.
 2. Plumbing and conduits in trenches (in the building).
 3. Roofing in progress and upon completion.
 4. Interior partitions work in progress and upon completion.
 5. Interior finishes work in progress and upon completion.
 6. Plumbing and mechanical work in progress and upon completion.
 7. Electrical work in progress and upon completion.
 8. Substantial completion.
 9. Final completion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
 1. Delivery Medium: Via email.
 2. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

3.7 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: Refer to Section 01 4216 - Definitions.

- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 - 2. Prepare using form identified in Section 00 6313 - Request for Interpretation Form.
 - 3. Combine RFI and its attachments into a single electronic file.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 - 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 - 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 - 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 - 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
 - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect's, and Contractor's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date, and requested reply date.
 - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances,

- and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
 - G. Transmit each RFI to Architect electronically, via email, in Portable Document Format (PDF) to Architect's email address.
 - 1. Architect's email address: Refer to Section 01 1000 - Summary.
 - 2. Create PDFs at native size and right-side up; illegible files will be rejected.
 - 3. Provide submittals in single Portable Document Format (PDF) file less than 10 Mb in size. File sizes larger than 10 Mb will be rejected by Architect's email firewall and will not be acknowledged, reviewed, or returned.
 - 4. RFIs submitted to email addresses other than the Architect's email address identified in Section 01 1000 - Summary will not be acknowledged, reviewed, or returned.
 - 5. An electronically-marked up file will be returned.
 - H. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
 - 3. Highlight items requiring priority or expedited response.
 - 4. Highlight items for which a timely response has not been received to date.
 - 5. Remove improper or frivolous RFIs.
 - I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.8 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 - 1. Submit at the same time as the preliminary schedule specified in Section - 01 3216 - Construction Progress Schedule.
 - 2. Coordinate with Contractor's construction schedule and schedule of values.
 - 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 - 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 - 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

- a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.
- 6. Provide Architect with updated submittal schedule:
 - a. Prior to progress meetings.
 - b. With applications for payments specified in Section 01 2000.

3.9 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - a. Clearly indicate applicable products, materials, colors, and other information as necessary for identification. Product Data that has not been properly edited by the Contractor will be returned for resubmittal.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Submit products and materials in the same specification section in one submittal. Submittals containing data from more than one specification section will be returned without review.
- D. Remove irrelevant or unnecessary data from submittals to facilitate accuracy and timely processing. Submittals containing an excessive amount of irrelevant or unnecessary information will be returned without review.
- E. Partial or incomplete submittals will be returned without review.
- F. Samples will be reviewed for aesthetic, color, or finish selection.
- G. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.10 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.11 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.

- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.12 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Extra Copies at Project Closeout: See Section 01 7800.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.13 SUBMITTAL PROCEDURES

- A. General Requirements:
 - 1. Use a separate transmittal for each item.
 - 2. Transmit using approved form.
 - a. Transmittal Form: Refer to Section 00 5000 - Contracting Forms and Supplements.
 - 3. Sequentially number each submittal with an original number in accordance with the following procedures:
 - a. Identify the first submittal of each specification section with the section number followed by a hyphen and numeral (Example: 05 5000-1).
 - b. Where necessary, identify resubmittals or separate submittals containing data such as samples and test results by the section number followed by a hyphen and sequential numbers 2, 3, etc. (Example: 05 5000-2):
 - c. Submittals that have not been identified in accordance with these procedures will be rejected without review.
 - 4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 - 5. Do not include safety data sheets (SDS) for materials and products.
 - a. Submittals including safety data sheets will be rejected without review and will be returned to the Contractor for resubmittal.
 - 6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
 - 7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Send submittals in electronic format via email to Architect.
 - 8. Schedule submittals to expedite the Project, and coordinate submission of related items.

- a. For submittals that require color selection the Architect reserves the right to withhold review until submittals for related products and materials requiring color selections are received.
- 9. Unacceptable uses for submittals:
 - a. Approval of substitutions (see Section - 01 6000 - Product Requirements).
 - b. Modifications to the Contract Documents.
 - c. Different products, materials, or manufacturers than those identified in the Contract Documents.
- 10. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
- 11. Provide space for Contractor and Architect review stamps.
- 12. When revised for resubmission, identify all changes made since previous submission.
- 13. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
- 14. Incomplete submittals will be rejected without review unless they are partial submittals for distinct portion(s) of the work, such as physical samples, and have received prior approval for their use.
- 15. Submittals not requested will be recognized, and will be returned "Not Reviewed",
- B. Product Data Procedures:
 - 1. Submit complete information required by individual specification sections.
 - 2. Collect required information into a single submittal.
 - 3. Submit concurrently with related shop drawing submittal.
 - 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 - 2. Reproductions of Architect's drawings or other documents, including those in electronic form, is prohibited without the specific written consent of the Architect.
 - a. Use of Architect's electronic CAD files to create shop drawings:
 - 1) Contractor will be required to execute Architect's Media Release Form prior to use of reproductions of the Contract Documents.
 - 2) Files may only be used to expedite production of shop drawings for this project. Use for another project or purpose is prohibited.
 - 3) Use of files is solely at receiver's risk. Architect does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions and quantities set forth in contract documents. In event of ambiguity, discrepancy or conflict between information on electronic media and that in contract documents, notify Architect of discrepancy and use information in hard copy drawings and specifications.
 - 4) Files do not necessarily represent latest contract documents, existing conditions, and record drawings. Receiver is responsible for incorporating addenda and modifications (Change Orders and Architect's Supplemental Instructions).
 - 5) Architect will not be responsible for computer viruses that may be present in digital files or their consequences, and receiver shall hold Architect harmless against costs, losses or damage caused by presence of computer virus in files or media.

3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items from the same specification section together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
 3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.
- E. Transmit each submittal to Architect electronically, via email, in Portable Document Format (PDF) to Architect's email address.
1. Architect's email address: Refer to Section 01 1000 - Summary.
 2. Create PDFs at native size and right-side up; illegible files will be rejected.
 3. Provide submittals in single Portable Document Format (PDF) file less than 10 Mb in size. File sizes larger than 10 Mb will be rejected by Architect's email firewall and will not be acknowledged, reviewed, or returned.
 4. File Name: Include submittal number, specification section name, and project identifier (abbreviated where necessary).
 - a. File name example: 03 3200-01_ConcreteReinforcing_AcmeOfficeBldg.pdf.
 5. Submittals submitted to email addresses other than the Architect's email address identified in Section 01 1000 - Summary will not be acknowledged, reviewed, or returned.
 6. An electronically-marked up file will be returned.
- F. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, as appropriate on each copy.
- G. Contract Time will not be extended for rejected submittals; for submittals that are required to be revised and resubmitted; or for submittals not processed or recognized because they were submitted without Contractor's stamp.
- H. Resubmittals: Architect will record time required to review resubmittals after original submittal and first resubmittal. Contractor shall reimburse Owner for charges of Architect and Architect's Consultants for reviewing submittal more than two times ("additional submittal review effort" hereafter).
1. Payment for Architect's charges to the Owner for additional submittal review effort will be charged to the Contractor by deducting Architect's charges from the Contract Sum.

3.14 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:

- a. "Approved", or language with same legal meaning.
 - b. "Approved as Noted", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 1) Resubmit entire submittal with corrections incorporated.
 - 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit entire submittal with corrections incorporated.
 - b. "Rejected".
 - 1) Resubmit entire submittal complying with requirements of Contract Documents.
 - 3. Items indicated by the Architect or the Architect's consultants as "Revise and Resubmit" or "Rejected" results in all items in the submittal to be resubmitted.
- E. Architect's and consultants' actions on items submitted for information:
- 1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.
 - 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.2 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 5 days.
- C. Within 10 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
- D. Within 10 days after joint review, submit complete schedule.
- E. Transmit schedules to Architect electronically, via email, in PDF format; Refer to Section 01 1000 - Summary for Architect's email address.
 - 1. Create PDFs at native size and right-side up; illegible files will be rejected.
 - 2. If required, an electronically-marked up file will be returned.
 - 3. Paper document submittals will not be reviewed.
- F. Submit updated schedule with each Application for Payment.
 - 1. No action will be taken on the Application for Payment until the schedule is approved by the Architect. If the schedule requires revision after Architect's review, no action will be taken on the Application for Payment until the resubmitted schedule is approved.

1.3 QUALITY ASSURANCE

- A. Scheduler: Contractor's personnel or specialist Consultant specializing in CPM scheduling with five years minimum experience in scheduling construction work of a complexity comparable to this Project, and having use of computer facilities capable of delivering a detailed graphic printout within 48 hours of request.
- B. Contractor's Administrative Personnel: 3 years minimum experience in using and monitoring CPM schedules on comparable projects.

1.4 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Sheet Size: Multiples of 8-1/2 x 11 inches.
- C. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PRELIMINARY SCHEDULE

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

3.2 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules to define critical portions of the entire schedule.
- E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- F. Coordinate content with schedule of values specified in Section 01 2000 - Price and Payment Procedures.
- G. Provide legend for symbols and abbreviations used.

3.3 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.4 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.5 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Update diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.6 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

SECTION 01 3553
SECURITY PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Security measures including formal security program and miscellaneous restrictions.

1.2 SECURITY PROGRAM

- A. Comply with Owner's security program requirements.
- B. Protect Work and Owner's operations from theft, vandalism, and unauthorized entry.
- C. Initiate program at project mobilization.
- D. Maintain program throughout construction period until Owner occupancy.

1.3 RESTRICTIONS

- A. Comply with local authority having jurisdiction.
- B. When on grounds of project, Contractor shall not allow work force to:
 - 1. Smoke.
 - 2. Possess or be under the influence of alcohol, drugs, or other controlled substances.
 - 3. Wear clothing with foul graphics.
- C. Personnel on site, directly or indirectly in the employ of Contractor are restricted from conversation and other interaction with Owner; Owner's staff; and visitors and other members of the public while on, or adjacent to the site except through jobsite meetings conducted by the Architect and the Owner or as otherwise determined by the Owner.
- D. Do not take photographs of Owner; Owner's staff; visitors and other members of the public.
- E. Communications with non-project related persons on or near the site shall be conducted by the Contractor's Project Manager or Project Superintendent.
- F. Graffiti-free Worksite:
 - 1. Remove graffiti on work site including, but not limited to, work in place; and Contractor's equipment, facilities, appurtenances, stored materials, barricading, refuse containers, and signage.
 - 2. Begin removal efforts within 24 hours of observation or notification; continue removal efforts expeditiously until completed.
 - 3. If Contractor fails to begin or complete graffiti removal, the graffiti may be removed by the Owner at Contractor's sole cost.
- G. Comply with Owner's procedures for individual visual identification of Contractor's workforce on site and in occupied areas.
 - 1. Wear Owner's identification badges at all times on site during the work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4000 QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. Inspection agencies and services.
- D. Contractor's construction-related professional design services.
- E. Contractor's design-related professional design services.
- F. Control of installation.
- G. Tolerances.
- H. Manufacturers' field services and reports.
- I. Defect Assessment.

1.2 REFERENCE STANDARDS

- A. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2020.
- B. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2015.
- C. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.

1.3 DEFINITIONS

- A. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
 - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- B. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.4 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

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

- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Temporary sheeting, shoring, or supports.
 - 2. Temporary scaffolding.
 - 3. Temporary bracing.
 - 4. Temporary stairs or steps required for construction access only.
 - 5. Temporary hoist(s) and rigging.

1.5 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
 - 1. Submit a Request for Interpretation to Architect if the criteria indicated are not sufficient to perform required design services.
- C. Scope of Contractor's Professional Design Services include, but may not be limited to, the following:
 - 1. Temporary erosion and sediment control: As described in Section 01 5713 - Temporary Erosion and Sediment Control.
 - 2. Concrete Mix Design: As described in Section 03 3000 - Cast-in-Place Concrete. No specific designer qualifications are required.
 - 3. Design of Structural Components: Include development of shop drawings, and performing shop and site work, as described in Section 13 3419 - Metal Building Systems.
 - 4. System Design: As described in Section 23 0913 - Instrumentation and Control Devices for HVAC.
 - 5. Fire Detection and Alarm Components: As described in Section 28 4600 - Fire Detection and Alarm.

1.6 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
 - 1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
 - 2. Include required product data and shop drawings.
 - 3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 - 4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- C. Test Reports: After each test/inspection, promptly submit (via email) copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.

- e. Identification of product and specifications section.
- f. Location in the Project.
- g. Type of test/inspection.
- h. Date of test/inspection.
- i. Results of test/inspection.
- j. Compliance with Contract Documents.
- k. When requested by Architect, provide interpretation of results.
- 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- D. Qualifications for Testing Agency Responsible for Testing Concrete, Asphalt, Soils, and Granular Materials: Submit copy of accreditation of laboratory facilities by the AASHTO Materials Reference Laboratory (AMRL).
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit report within 30 days of observation to Architect for information.
 - 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- H. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
 - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.7 QUALITY ASSURANCE

- A. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.8 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing and inspection.

1. Testing that will be performed by Contractor's independent testing agency include, but are not limited to, the following:
 - a. Testing and balancing of HVAC system.
 - b. Testing and inspections required by the Drawings and individual specification sections.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, and ASTM E699.
 2. Inspection agency: Comply with requirements of ASTM E329.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.2 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.3 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 2. Perform specified sampling and testing of products in accordance with specified standards.

3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 5. Perform additional tests and inspections required by Architect.
 6. Attend preconstruction meetings and progress meetings.
 7. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.4 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.5 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Owner, it is not practical to remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

END OF SECTION

SECTION 01 4100
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY OF REFERENCE STANDARDS

- A. Regulatory requirements applicable to this project are the following:
- B. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
- C. State of New Mexico amendments to some or all of the following.
- D. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- E. NFPA 101 - Life Safety Code; 1997.
- F. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. IAPMO (UPC) - Uniform Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. IAPMO (UMC) - 2012 Uniform Mechanical Code.
- I. Fuel Gas Code: New Mexico Administrative Code (NMAC) Title 19 New Mexico Liquefied Petroleum Gas Standard (Title 19 Natural Resources and Wildlife, Chapter 15 Oil and Gas, Part 40 New Mexico Liquefied Petroleum Gas Standard); 2006.
- J. Electrical Code: 2020 National Electrical Code.
- K. ICC (IECC) - International Energy Conservation Code; 2021.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4216 DEFINITIONS

PART 1 GENERAL

1.1 SUMMARY

- A. This section supplements the definitions contained in the General Conditions.
- B. Other definitions are included in individual specification sections.

1.2 DEFINITIONS

Addenda, Addendum: Refer to Section 00 2113 - Instructions to Bidders.

Agreement: Refer to Section 00 7200 - General Conditions.

Alternate Bid (or Alternate): An amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

Architect: Refer to Section 00 7200 - General Conditions.

Architect's Supplemental Instructions (ASI): A written order for a minor change in the Work issued by the Architect.

as-built drawings: Same as Record Drawings.

as-constructed record drawings: Same as Record Drawings.

Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.

Base Bid: Refer to Section 00 2113.

Bid: Refer to Section 00 2113 - Instructions to Bidders.

Bidder: Refer to Section 00 2113 - Instructions to Bidders.

Bidding Documents: Refer to Section 00 2113 - Instructions to Bidders.

Bidding Requirements: Refer to Section 00 2113 - Instructions to Bidders.

Change Order: Refer to Section 00 7200 - General Conditions.

Clarification: An answer from the Owner, in response to an inquiry from the Contractor, intended to make requirement(s) of the contract documents clearly understood. Clarifications do not change requirements of the contract documents and will be provided to the Contractor in the form of sketches, drawings, or narrative in accordance with requirements of the Contract Documents.

Conditions of the Contract: Refer to Section 00 7200 - General Conditions.

Construction Change Directive: A written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

Contract (The Contract): Refer to Section 00 7200 - General Conditions.

Contract Documents: Refer to Section 00 7200 - General Conditions.

Contractor: Refer to Section 00 7200 - General Conditions.

Design Professional: Same as Architect.

Drawings: Refer to Section 00 7200 - General Conditions.

Engineer: Same as Architect.

furnish: To supply, deliver, unload, and inspect for damage.

install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.

Modification: Refer to Section 00 7200 - General Conditions.

Notice of Nonconformance: A Notice issued by the Owner documenting Work or some portion thereof that has not been performed in accordance with the contract documents. Payment shall not be made on any portion of the work for which a Notice of Nonconformance has been issued and the work not corrected to the satisfaction of the Owner.

Upon receipt of a Notice of Nonconformance the Contractor shall provide a written Response within seven days after receipt of the Notice. The Contractor's response shall detail either (a) why the Contractor believes the work has been performed in accordance with the contract documents or (b) the corrective action the Contractor intends to take, at Contractor's sole expense, to correct the non-conforming work.

If the Contractor disputes issuance of the Notice the Owner has five days to respond by either (a) withdrawing the Notice or (b) directing the Contractor to correct the work; If Owner's response directs the Contractor to correct the work, the Contractor shall do so within seven days after receipt of such direction from Owner, or such other time as may be agreed to with the Owner.

Owner: Refer to Section 00 7200 - General Conditions.

Procurement Documents: Same as the Bidding Documents.

Procurement Requirements: Same as the Bidding Requirements

product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.

Project (The Project): Refer to Section 00 7200 - General Conditions.

project communications: Routine communications between the Owner and the Contractor shall be in written in letter, memo, field report, fax, or email format. Such communications, including verbal communications, shall not be identified or recognized as a Modification or a Request for Interpretation (RFI) nor shall they substitute for any other written requirement pursuant to the provisions of these contract documents.

Project Manual: The book-sized volume that includes the procurement requirements, the contracting requirements, and the specifications.

provide: To furnish and install.

Punch List: A comprehensive list of items to be completed or corrected prior to final payment.

record drawings: Drawings marked up by the Contractor to indicate field changes, hidden conditions, and modifications.

Request for Information (RFI): Same as Request for Interpretation.

Request for Interpretation (RFI): A written request from the Contractor to the Owner, seeking an interpretation or clarification of some requirement of the contract documents. The Contractor shall clearly and concisely set forth the issue for which it seeks clarification or interpretation and why a response is needed from the Owner. The Contractor shall, in the request, set forth its interpretation or understanding of the contract document's requirements along with reasons why it has reached such an understanding.

Requests for Interpretation (RFIs) may only be submitted by the Owner or the Contractor and shall only be submitted on Request for Interpretation Forms provided by the Owner.

Refer to Section 00 6313 - Request for Interpretation Form for the form that is to be used for RFIs.

Owner's response to Requests for Interpretation will not change the Contract sum or the Contract time.

The Owner acknowledges that this is a complex project. Based upon the Owner's experience with projects of similar complexity, the Owner anticipates that there will probably be some 150 Request for Interpretations (RFIs) on this project.

Special Inspections:

Special Inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that require special expertise to ensure compliance with the approved contract documents and the referenced standards.

Special Inspections are performed by a testing agency independent from the Contractor and acceptable to the AHJ, are provided by the Owner or the Owner's authorized agent, and are separate from and independent of tests and inspections conducted by the Contractor for the purposes of quality assurance and contract administration.

Special Inspections required for this project are identified in the Contract Documents.

Specifications: Refer to Section 00 7200 - General Conditions.

Substantial Completion: Refer to Section 00 7200 - General Conditions.

Sub-contractor, subcontractor: Refer to Section 00 7200 - General Conditions.

Supplementary Conditions (of the Contract): Conditions that amend and supplement the General Conditions defined in Section 00 7200 - General Conditions and other provisions of Contract Documents. Refer to Section 00 7300 - Supplementary Conditions.

supply: Same as furnish.

Work (The Work): Refer to Section 00 7200 - General Conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4219
REFERENCE STANDARDS

END OF SECTION

SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary Controls: Barriers, enclosures, and fencing.
- C. Waste removal facilities and services.
- D. Project identification sign.

1.2 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2017, with Errata (2018).
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.

1.3 TEMPORARY UTILITIES

- A. Provide and pay for electrical power required for construction purposes.

1.4 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities is not permitted.
- C. Maintain daily supplies of deodorizers, toilet tissue and handwashing materials.
- D. Maintain daily in clean and sanitary condition.

1.5 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.
- D. Traffic Controls: Provide as required by local authorities having jurisdiction.

1.6 FENCING

- A. Provide 6 foot high commercial grade chain link fence around construction site including stored materials that are not contained within locked, tamperproof, non-removable containers.
 - 1. Locate fencing as required to prevent the general public from entering the construction area.
 - 2. Store tools and materials not located in locked, tamperproof, non-removable containers within fencing.
 - 3. Equip fencing with vehicular gates with locks.
 - 4. Coordinate location of fencing and gates so as not to interfere with Owner's use of site.

5. Lock gates at the end of each work day.
6. Provide Owner with keys to locks on gates.

1.7 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons.
- B. Provide temporary closures to prevent damage to public and private property from painting and other construction activities.

1.8 INTERIOR ENCLOSURES

- A. Provide temporary partitions to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.9 STORAGE

- A. Provide storage facilities as required to deter theft and vandalism.
- B. Locate stored materials within locked fencing area and/or within locked storage containers.
 1. Coordinate location of stored materials as required to prevent access by the public.
- C. Coordinate location of on-site storage facilities with Owner prior to beginning work.
- D. Coordinate location of storage facilities with Owner as required to allow:
 1. Use of site and premises by Owner.
 2. Use of site and premises by the public.
- E. Owner's facilities may not be used for storage.

1.10 FIRE PROTECTION

- A. Provide and maintain temporary fire protection components. Establish and follow procedures to protect against fire losses. Comply with NFPA 241.
- B. Fire extinguishers: Provide hand carried, portable, UL rated fire extinguishers of type and size recommended by NFPA 10 for building exposure conditions. Place in accessible, convenient locations in clear view with a minimum of one extinguisher per floor.
- C. Access: Maintain unobstructed access to fire hydrants, water supply, fire extinguishers, stairways, and access routes for fighting fires.
- D. Heating devices: Exercise care and monitor use of temporary heaters to minimize fire risk.
- E. Store combustible materials in fire-safe containers.
- F. Volatile products: Do not store paints, varnishes, paint removers, solvents, adhesives, cleaning rags, and other volatile products in building. Take precautionary measures to prevent fire hazards and spontaneous combustion.

- G. Cutting and welding: Approve in advance use of open flame cutting, welding, and soldering equipment. Ensure that safe conditions exist before granting approval.

1.11 SECURITY - SEE SECTION 01 3553

1.12 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Contractor's use of the site is restricted; Obtain Owner's approval for access points, parking, vehicular circulation, material storage, and equipment storage prior to starting the Work.
- F. Lock and secure all vehicles in parking areas.
- G. Construction parking, vehicular circulation, equipment storage, and material storage on new pavement is prohibited.

1.13 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
 - 1. Locate waste containers within locked fencing area.
 - 2. Coordinate location of waste container(s) with Owner as required to allow:
 - a. Use of site by Owner.
 - b. Use of site by the public.
- B. Provide containers with lids. Remove trash from site periodically.
- C. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.14 PROJECT IDENTIFICATION

- A. Project sign is at Contractor's option.
 - 1. Confirm quantity and types of signs that will be allowed with Owner including, signs from Contractor's workforce.
 - 2. Erect on site at location(s) established by Owner.
- B. Design, construction, and location of signs must be approved by Owner.
- C. No other signs are allowed without Owner permission except those required by law.

1.15 FIELD OFFICES

- A. Provide space for Project meetings, with table and chairs to accommodate 8 persons.
- B. Progress meetings will be conducted on site, at Owner's facility, or by means of communications media technology over the Internet, at Owner's discretion.
- C. Locate office within fencing area.
- D. Locate offices a minimum distance of 30 feet from existing and new structures.

- E. Locate offices a minimum distance of 30 feet from existing and new structures.
- F. Lock office at end of each workday.

1.16 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
 - 1. Pay all outstanding utility bills before final acceptance of the work by the Owner.
- B. Remove underground installations to a minimum depth of 3 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5100
TEMPORARY UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity, heat, and water.

1.2 TEMPORARY ELECTRICITY

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Connect to Owner's existing power service.
 - 1. Do not disrupt Owner's need for continuous service.
 - 2. Exercise measures to conserve energy.
 - 3. Provide separate metering and reimburse Owner for cost of energy used.
- D. Provide temporary electric feeder from existing building electrical service at location as directed.
- E. Complement existing power service capacity and characteristics as required.
- F. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
- G. Provide main service disconnect and over-current protection at convenient location .
- H. Permanent convenience receptacles may be utilized during construction.
- I. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.3 TEMPORARY HEATING

- A. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.
- C. Existing facilities shall not be used.

1.4 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Contractor.
- B. Connect to existing water source.
 - 1. Exercise measures to conserve water.
 - 2. Provide separate metering and reimburse Owner for cost of water used.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5713
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.

1.2 PERFORMANCE REQUIREMENTS

- A. Comply with requirements of local authorities having jurisdiction for erosion and sedimentation control.
- B. Secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities that shall include utility expansion charges and tapping fees.
- C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
 - 1. Obtain and pay for permits and provide security required by authority having jurisdiction.
- D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
 - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
 - 2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.
- F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
 - 1. Control movement of sediment and soil from temporary stockpiles of soil.
 - 2. Prevent development of ruts due to equipment and vehicular traffic.
 - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
 - 1. Prevent windblown soil from leaving the project site.
 - 2. Prevent tracking of mud onto public roads outside site.
 - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
 - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

- H. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
 - 2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.
- I. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
 - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- J. Open Water: Prevent standing water that could become stagnant.
- K. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Materials: Provide mulch, seed, bales, geotextile fabrics, barriers, silt fences, gravel, rip rap, and other erosion control materials as required to comply with erosion control requirements of authorities having jurisdiction.
- B. Grass Seed at Native Grass Areas Disturbed by Construction: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.2 PREPARATION

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.3 SCOPE OF PREVENTIVE MEASURES

- A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

3.4 INSTALLATION

- A. Install materials in accordance with soil erosion requirements of authorities having jurisdiction.
- B. Seeding at Native Grass Areas Disturbed by Construction:
 - 1. When hydraulic seeder is used, seedbed preparation is not required.
 - 2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
 - 3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
 - 4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
 - 5. Incorporate fertilizer into soil before seeding.
 - 6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.
 - 7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
 - 8. Repeat irrigation as required until grass is established.

3.5 MAINTENANCE

- A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
- B. Repair deficiencies immediately.
- C. Clean out temporary sediment control structures promptly and relocate soil on site.
- D. Place sediment in appropriate locations on site; do not remove from site.
- E. Promptly remove excavated materials within the public right-of-way to prevent it from washing off the project site.
- F. Maintain preventive measures to prevent soil from eroding from the site onto other property.

3.6 CLEAN UP

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

SECTION 01 6000
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.2 REFERENCE STANDARDS

- A. NEMA MG 1 - Motors and Generators; 2018.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- D. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.1 EXISTING PRODUCTS

- A. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.2 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 01 4000 - Quality Requirements, for additional source quality control requirements.
- C. Verify utility requirements and characteristics of equipment are compatible with facility utilities. Coordinate work of various specification sections having interdependent requirements for installing, connecting to, and placing in service such equipment.
- D. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Made of wood from newly cut old growth timber.
 - 3. Containing lead, cadmium, or asbestos.
- E. Urea-Formaldehyde Prohibition:
 - 1. Overall Project Requirement: Provide products having no added urea-formaldehyde materials.
 - 2. Specific Product Categories: Comply with limitations specified elsewhere.
- F. Motors: NEMA MG 1 Type. Specific motor type is specified in individual specification sections.
- G. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
- H. Cord and Plug: Provide minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

2.3 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Use of the Words "Basis-of-Design": Use single manufacturer's product named; or other products meeting specifications where other manufacturers or other manufacturer's products are named.
 - 1. Evaluation of comparable products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics for purposes of evaluating comparable products.
- D. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
 - 1. Substitutions: Comply with Substitution Limitations Article in Part 3 of this Section.
- E. Where a brand name "or equal" or, "or approved equal" or, "or equivalent" is used in the Specifications or the Drawings the use of the brand name is for the purpose of describing the standard of quality, performance and characteristics desired and is not intended to limit or restrict competition.

1. Evaluation of comparable products: In addition to the brand name product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products. Manufacturer's published attributes and characteristics of brand name products also establish salient characteristics for purposes of evaluating comparable products.

2.4 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.1 SUBSTITUTION LIMITATIONS

- A. Substitution requests prior to receipt of Bids must be submitted by Bidders. Such requests must be accompanied by Bidder's letter of transmittal or email, transmitted from a person legally authorized to bind the Bidder to a Contract.
 1. Substitution requests received directly from sub-bidders, subcontractors, manufacturers, material suppliers, and others will not be recognized or processed.
- B. The Owner will not consider requests for substitutions for specified products after date of Agreement except as follows:
 1. When it is determined the product does not comply with governing regulations.
 2. When the product is no longer available.
 - a. When a product is no longer available provide written documentation from the manufacturer to the Architect that confirms the product is no longer available.
 - b. When a product is determined to be no longer available provide an equal product in accordance with the following procedures:
 - 1) Products specified by naming one manufacturer only: Provide a product of the manufacturer named and meeting specifications.
 - 2) Products specified by naming one or more manufacturers: Provide a product of one of the manufacturers named and meeting specifications.
 - 3) Products specified by reference standards or by description only: Provide products meeting specified standards or description.
- C. Submit substitution requests in compliance with requirements in Section 01 2500 - Substitution Procedures and by completing the form in Section 01 2501 - Substitution Request Form; see this section for additional information and instructions.
- D. The Owner reserves the right to reject substitutions on basis of color, pattern, compatibility, aesthetic qualities, or manufacturer's past service, even when fabrication and materials are equivalent.

3.2 OWNER-SUPPLIED PRODUCTS

- A. See Section 01 6400 - Owner-Furnished Products for identification of Owner-supplied products; and Owner's and Contractor's responsibilities.

3.3 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.4 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project roof areas.
 - 1. Products and materials stored on roofs:
 - a. Direct contact with roof surface is prohibited. Protect roof surface with structural plywood sheathing over high-density rigid insulation to prevent damage to roof surface.
 - b. Roof equipment removed for relocation or reinstallation: Storing equipment on roof is prohibited; store equipment on sloped supports above ground.
 - 2. Handling products and materials on roofs: Transporting products and materials on wheeled vehicles or other devices in direct contact with roof surface is prohibited.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Arrange storage of materials and products to allow for visual inspection for the purpose of determination of quantities and amounts.
- F. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- G. For exterior storage of fabricated products, place on sloped supports above ground.
- H. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- I. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- J. Comply with manufacturer's warranty conditions, if any.
- K. Do not store products directly on the ground.

- L. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- M. Prevent contact with material that may cause corrosion, discoloration, or staining.
- N. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- O. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

SECTION 01 6400
OWNER-FURNISHED PRODUCTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Owner-furnished products and materials to be installed by Contractor.
 - 1. Procedures and requirements for coordinating, scheduling, handling, and storing Owner-furnished products and materials to be installed by Contractor.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Owner-furnished products and materials to be installed by Contractor:
 - 1. Obtain original manufacturer's shop drawings and product data from Owner prior to proceeding with installation; if unavailable, obtain from manufacturer.
 - 2. Compare manufacturer's shop drawings and product data with details on Drawings and notify Architect immediately of any discrepancies; discontinue affected Work in area until notified to resume work.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.
- D. Scheduling: Review delivery dates and vendor lead times for each item and coordinate with construction schedule.
 - 1. Report recommended changes to Owner if changes to delivery dates become necessary during construction.
 - 2. Report problems in coordinating delivery dates with the construction schedule to Owner.

1.3 SUBMITTALS

- A. See Section 01 3000 for submittal procedures.
- B. Owner-furnished products to be installed by Contractor:
 - 1. Submit bills of lading, installation instructions, shop drawings, maintenance materials, warranties, product data, spare parts, and other manufacturer's data and materials directly to Owner.
 - 2. Record submitted items in letter of transmittal.
 - a. Record date of submittal.
 - b. Record each item submitted.
 - c. Obtain Owner's signature verifying receipt and date of submitted items.
 - d. Provide one copy to Owner for Owner's records; keep one copy for Contractor's records.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Owner-Furnished Products to be Installed by Contractor:
 - 1. Provide labor and equipment necessary to receive, unload, and store materials and products.
 - 2. Verify that number of packages received matches number of bill of lading.
 - 3. Note discrepancies between items received and items listed on bill of lading.
 - 4. Open and inspect products and materials within 48 hours of receipt.
 - a. Compare model number, size, color, and other characteristics with product data provided by Owner.

- b. Items with signs of visible damage: Open and inspect at time of delivery; verify if items are damaged.
 - c. Notify Owner immediately of discrepancies or damaged products and materials.
- 5. Deliver bills of lading to Owner, and record of any damage or discrepancies.
- 6. Repair or replace shortages and damaged items not recorded and reported.
- B. Store Owner-furnished products to be installed by Contractor under cover and elevated above grade, in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 OWNER-FURNISHED PRODUCTS TO BE INSTALLED BY CONTRACTOR

- A. The following products will be provided by the Owner, for installation by the Contractor:
 - 1. Soap dispensers.
 - a. Locations: As indicated on the Drawings.
- B. Owner's Responsibilities:
 - 1. Provide locations of Owner-supplied products to Contractor.
 - 2. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 - 3. Arrange and pay for product delivery to site.
 - 4. On delivery, inspect products jointly with Contractor.
 - 5. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 6. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
 - 1. Inspect products for completeness or damage jointly with Owner.
 - 2. Review Owner reviewed shop drawings, product data, and samples.
 - 3. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 - 4. Handle, store, install and finish products.
 - 5. Repair or replace items damaged after receipt.

2.2 ACCESSORIES

- A. General: Provide concealed blocking, anchors, fasteners, and other accessories as recommended by manufacturer for installation of products and materials.
 - 1. Fasteners for exterior signs: Tamper-resistant, stainless steel.
 - 2. Fasteners for interior signs: Corrosion-resistant metal, shiny finish.

PART 3 EXECUTION

3.1 INSTALLERS

- A. Installer Qualifications:
 - 1. Signage: Refer to Section 10 1400.

3.2 EXAMINATION

- A. Verification of Conditions:
 - 1. Verify concealed blocking for wall-mounted items has been provided in accordance with manufacturer's requirements and Section 06 1000 - Rough Carpentry.

3.3 PREPARATION

A. Owner's Responsibilities:

1. Provide locations of Owner-supplied products to Contractor.
2. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
3. Arrange and pay for product delivery to site.
4. On delivery, inspect products jointly with Contractor.
5. Submit claims for transportation damage and replace damaged, defective, or deficient items.
6. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:

1. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
2. Remove, relocate, and install products as indicated.
3. Review Owner reviewed shop drawings, product data, and samples.
4. Handle, store, install and finish products.
5. Repair or replace items damaged after receipt.
6. Provide utilities to Owner-furnished products in accordance with manufacturer's requirements.

3.4 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install signage in accordance with Section 10 1400.

C. Notify Architect of unexpected conditions and discontinue affected Work in area until notified to resume work.

3.5 CLEANING

A. Clean products and materials.

3.6 PROTECTION

A. Protect installed items from subsequent construction operations.

END OF SECTION

SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of Owner personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- I. General requirements for maintenance service.

1.2 REFERENCE STANDARDS

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Observation, containment, or security capacity of electronic security components.
 - 6. Containment capacity of fencing and gate components.
 - 7. Work of Owner or separate Contractor.
 - 8. Include in request:
 - a. Identification of Project.
 - b. Location and description of affected work.
 - c. Necessity for cutting or alteration.
 - d. Description of proposed work and products to be used.
 - e. Alternatives to cutting and patching.
 - f. Effect on work of Owner or separate Contractor.
 - g. Written permission of affected separate Contractor.
 - h. Date and time work will be executed.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities.

- D. Contractor's Progress Photographs: Within 24 hours of Architect's request provide progress photographs of the work in place at locations as directed. Deliver photographs to Architect's office via electronic mail or overnight delivery.
 - 1. No more than 2 requests for progress photographs will be made by Architect during the project, except as required to document additional work added to the project by change order.
 - 2. Quantity of progress photographs included with each submittal: 12 (minimum).
 - 3. Photographs requested by Architect, if any, are in addition to photograph requirements specified in Section 01 3000 - Administrative Requirements.

1.4 QUALIFICATIONS

- A. For demolition work, employ a firm specializing in the type of work required.
 - 1. Minimum of ten years of documented experience.

1.5 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Provide two, working, 2A:10B:C fire extinguishers within 25 feet of all welding or grinding activities or work with open flames or sparks.
- C. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- D. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- E. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- F. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
 - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- G. Erosion and Sediment Control: Provide in accordance with Section 01 5713 - Temporary Erosion and Sedimentation Control.
- H. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- I. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- J. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.6 COORDINATION

- A. See Section 01 1000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

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

- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.3 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within seven days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.4 GENERAL INSTALLATION REQUIREMENTS

- A. Support structure and walls as necessary in advance of cutting out units.
- B. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- C. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- D. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- E. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- F. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- G. Make neat transitions between different surfaces, maintaining texture and appearance.

3.5 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 .
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.

2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 2. Remove items indicated on drawings.
 3. Relocate items indicated on drawings.
 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, and Electrical): Remove, relocate, and extend existing systems to accommodate new construction.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 2. Remove and reinstall equipment on roof curbs being extended or replaced.
 3. Remove and reinstall ductwork and services to equipment located on roof curbs being extended or replaced.
 4. Extend ductwork, piping, conduits, and wiring to equipment located on roof curbs being extended or replaced.
 5. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 6. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. See Section 01 1000 for other limitations on outages and required notifications.
 - c. Provide temporary connections as required to maintain existing systems in service.
 7. Verify that abandoned services serve only abandoned facilities.
 8. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.
 4. Patch as specified for patching new work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- H. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

- I. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- J. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
- K. Where foot traffic is required over existing roof system protect roofing with exterior grade construction panels of suitable thickness to prevent damage from occurring or other materials that are acceptable to the Architect.
- L. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- M. Refinish existing surfaces as indicated.
- N. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
- O. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
 - 1. Patch as specified for patching new work.
- P. Clean existing systems and equipment.
- Q. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- R. Do not begin new construction in alterations areas before demolition is complete.
- S. Comply with all other applicable requirements of this section.

3.6 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Fill in demolished openings and penetrations.
 - 4. Provide openings for penetration of mechanical, electrical, and other services.
 - 5. Match work that has been cut to adjacent work.
 - 6. Repair areas adjacent to cuts to required condition.
 - 7. Repair new work damaged by subsequent work.
 - 8. Remove samples of installed work for testing when requested.
 - 9. Remove and replace defective and non-complying work.
- D. Execute cutting and patching including excavation and fill to complete the work, to uncover work to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit Products together to integrate with other work.

- E. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- F. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- H. Restore work with new products in accordance with requirements of Contract Documents.
- I. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- J. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material, to full thickness of the penetrated element.
- K. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Install built in masonry work to match and align with existing, with joints and coursing true and level, faces plumb and in line. Build in all openings, accessories and fittings.
 - 4. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- L. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- M. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.
- N. Visual Requirements: Do not cut and patch in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.
- O. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.
 - 1. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
 - a. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - b. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 1) Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.

- 2) Patch repair, or rehang ceilings as necessary to provide an even-plane surface of uniform appearance.
2. Patch exposed holes, voids, and damaged surfaces in walls, ceilings, and floors where demolished or previously located equipment, conduits, piping, fixtures, wall mounted items, floor mounted items, and ceiling mounted items have been removed.

3.7 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.8 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Protect work from spilled liquids. If work is exposed to spilled liquids, immediately remove protective coverings, dry out work, and replace protective coverings.
- G. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Prohibit traffic from landscaped areas.
- I. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.9 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel in accordance with manufacturers' instructions.

- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

3.10 DEMONSTRATION AND INSTRUCTION

- A. See Section 01 7900 - Demonstration and Training.

3.11 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.
- B. Testing, adjusting, and balancing HVAC systems: See Section 23 0593 - Testing, Adjusting, and Balancing for HVAC.

3.12 FINAL CLEANING

- A. Execute final cleaning prior to Substantial Completion.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, and downspouts.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.13 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect and Owner.
- B. Accompany Architect on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's comprehensive list of items to be completed or corrected.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
 - 1. Progress Photographs: Upon request by Architect, take photographs as evidence of existing project conditions as follows:
 - a. Within 24 hours of Architect's request provide progress photographs of the work at locations as directed.
 - b. Provide factual presentation.
 - c. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

- d. A maximum of 24 photographs will be required.
 - e. Deliver photographs to Architect's office via electronic mail or overnight delivery.
 - f. Architect reserves the right to determine whether project is ready for Substantial Completion Inspection based solely upon the evidence from the progress photos.
 - g. If Architect deems project is not ready for Substantial Completion Inspection, notify Architect when work is ready, and submit new progress photographs at locations as directed by Architect.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
 - 1. Include comprehensive list of items to be completed or corrected prior to final payment (Contractor's Punch List). Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents .
 - E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
 - F. Upon receipt of Contractor's certification that the Work is complete, the Architect will make an inspection to determine whether the work or designated portion thereof can be occupied or utilized by the Owner for its intended use (substantially complete).
 - 1. If the Architect determines any item, whether or not included on the Contractor's Punch List, is not substantially complete, the Contractor shall, before issuance of the Certificates of Substantial Completion, complete or correct such item upon notification by the Architect.
 - 2. If the Architect determines any item not included on the Contractor's Punch List is not in accordance with the Contract Documents, and that the work is substantially complete, the Architect will provide the Contractor with a list of the items (Architect's Punch List), and include it with the executed Certificates of Substantial Completion, for completion or correction.
 - G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
 - H. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
 - I. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.14 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

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

END OF SECTION

SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Owner may decide to pay for additional recycling, salvage, and/or reuse based on Landfill Alternatives Proposal specified below.
- E. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
 - 1. Aluminum and plastic beverage containers.
 - 2. Corrugated cardboard.
 - 3. Wood pallets.
 - 4. Clean dimensional wood.
 - 5. Land clearing debris, including brush, branches, logs, and stumps; see Section 31 1000 - Site Clearing for use options.
 - 6. Concrete.
 - 7. Concrete masonry units.
 - 8. Asphalt paving.
 - 9. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - 10. Glass.
 - 11. Gypsum drywall and plaster.
 - 12. Clean plastic buckets and containers.
 - 13. Carpet, carpet cushion, carpet tile, and carpet remnants: DuPont (<http://flooring.dupont.com>) and Interface (www.interfaceinc.com) conduct reclamation programs.
 - 14. Paint.
 - 15. Plastic sheeting.
 - 16. Rigid foam insulation.
 - 17. Fluorescent lamps (light bulbs).
 - 18. Acoustical ceiling tile and panels.
- F. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
 - 5. Incineration, either on- or off-site.

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

1.2 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.3 SUBMITTALS

- A. Landfill Alternatives Proposal: Within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner, submit a projection of trash/waste that will require disposal and alternatives to landfilling, with net costs.
 - 1. Submit to Architect for Owner's review and approval.
 - 2. If Owner wishes to implement any cost alternatives, the Contract Sum will be adjusted as specified elsewhere.

3. Include an analysis of trash/waste to be generated and landfill options as specified for Waste Management Plan described below.
 4. Describe as many alternatives to landfilling as possible:
 - a. List each material proposed to be salvaged, reused, or recycled.
 - b. List the proposed local market for each material.
 - c. State the estimated net cost resulting from each alternative, after subtracting revenue from sale of recycled or salvaged materials and landfill tipping fees saved due to diversion of materials from the landfill.
- B. Once Owner has determined which of the landfill alternatives addressed in the Proposal above are acceptable, prepare and submit Waste Management Plan; submit within 10 calendar days after notification by Architect.
- C. Waste Management Plan: Include the following information:
1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
 2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
 3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
 - a. List each material proposed to be salvaged, reused, or recycled.
 - b. List the local market for each material.
 - c. State the estimated net cost, versus landfill disposal.
 4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
 5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
 6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.

PART 2 PRODUCTS

2.1 PRODUCT SUBSTITUTIONS

PART 3 EXECUTION

3.1 WASTE MANAGEMENT PROCEDURES

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Prebid meeting.
 - 2. Preconstruction meeting.
 - 3. Regular job-site meetings.
 - 4. Job safety meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. As a minimum, provide:
 - a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
 - b. Separate dumpsters for each category of recyclable.
 - c. Recycling bins at worker lunch area.
 - 2. Provide containers as required.
 - 3. Provide temporary enclosures around piles of separated materials to be recycled or salvaged.
 - 4. Provide materials for barriers and enclosures that are nonhazardous, recyclable, or reusable to the maximum extent possible; reuse project construction waste materials if possible.
 - 5. Locate enclosures out of the way of construction traffic.
 - 6. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 7. If an enclosed area is not provided, clearly lay out and label a specific area on-site.
 - 8. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

SECTION 01 7800
CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project record documents.
- B. Operation and maintenance data.
- C. Certificates of Inspection and Compliance.
- D. Warranties and bonds.

1.2 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
 - 1. Submit one set of preliminary draft Project Record Documents 15 days prior to Final Inspection. This set will be reviewed and returned after inspection, with Architect's comments.
 - a. Project Record Documents: Provide the following:
 - 1) Contractor's marked-up Drawings.
 - 2) Contractor's approved submittals.
 - b. Format: Full-size, full-color, 300 dpi scans of approved marked-up drawings, in Portable Document Format (PDF) format, stored on USB 3.0 flash drive with an integrated USB interface that is compatible with MS Windows and OSX operating systems.
 - c. Revise Project Record Documents as required to incorporate Architect's comments prior to final submission.
 - 1) Submit revised documents 10 days after receiving Architect's comments.
- B. Operation and Maintenance Data:
 - 1. Submit preliminary draft or proposed formats and outlines of contents. Architect will review and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.
 - 4. Format: Provide documents in the following formats:

- a. Printed Format: One printed copy of completed documents, included in Operation and Maintenance Manual Binder.
 - b. Electronic Format: One set of full-color, 300 dpi scans of completed documents converted into Portable Document Format (PDF) files and stored on a USB 3.0 flash drive with an integrated USB interface that is compatible with MS Windows and OSX operating systems.
- D. Certificates of Inspection and Compliance.
 - 1. For inspections throughout the construction period required by regulatory agencies, obtain and maintain certificates issued to show compliance.
 - 2. Assemble certificates and any formal written evidence of regulatory compliance in three ring binder with table of contents and submit to Design Professional prior to or in conjunction with submission of Notice of Substantial Completion.
 - 3. Certificate of Occupancy: Prior to Substantial Completion, obtain from authorities having jurisdiction Certificate of Occupancy. Submit with Notice for Substantial Completion.
 - 4. Format: Provide documents in the following format:
 - a. Printed Format: One printed copy of completed documents, included in Operation and Maintenance Manual Binder.
 - b. Electronic Format: Full-size, full-color, 300 dpi scans of each document, in PDF format, stored on a USB 3.0 flash drive with an integrated USB interface that is compatible with MS Windows and OSX operating systems.
- E. Insurance Information.
 - 1. Submit prior to or in conjunction with submission of Contractor's request for Substantial Completion information regarding insurance including change over requirements and insurance extensions.
- F. Maintenance Tools.
 - 1. Provide special tools, instruments, and other implements required for the functional operation and maintenance of equipment, systems, and other components installed as part of this project.
- G. Extra Materials.
 - 1. Provide spare parts and maintenance materials in quantities specified in individual sections.
 - 2. Prior to or concurrent with submission of Notice of Substantial Completion deliver extra materials in unopened containers to Owner at designated storage area at project site and place in location as directed. Obtain receipt from Owner.
- H. Keys.
 - 1. Prior to or in conjunction with submission of Contractor's request for Substantial Completion, provide Owner with all keys for:
 - a. Toilet accessories.
 - b. Electrical panel boards and other equipment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.

3.2 RECORD DRAWINGS

- A. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 3. Field changes of dimension and detail.
 - 4. Details not on original Contract drawings.
 - 5. Concealed elements that would be difficult to measure and record at a later date.
 - 6. New information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
 - 7. Related modification reference numbers where applicable (e.g. ASI 002, RFI 32, CO 03).
- B. Label each sheet of Record Drawings to read "Record Drawing."

3.3 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.4 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:

1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Additional information as specified in individual product specification sections.
- D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- E. Format: Provide preliminary and completed documents in the following format:
1. Electronic Format: One set of full-color, 200 dpi scans of completed documents, converted into searchable, Portable Document Format (PDF) files stored on a USB 3.0 flash drive with an integrated USB interface that is compatible with MS Windows and OSX operating systems.

3.5 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Provide control diagrams by controls manufacturer as installed.
- J. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- K. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- L. Include test and balancing reports.

M. Additional Requirements: As specified in individual product specification sections.

3.6 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate divider for each system.
- C. Cover: Identify manuals with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- D. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- E. Tables of Contents: List every item separated by a divider, using the same identification as on the divider; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- F. Provide dividers for each separate product and system; identify the contents on the divider; immediately following the divider include a description of product and major component parts of equipment.
- G. Arrangement of Contents: Organize each volume in parts as follows:
 - 1. Project Directory.
 - 2. Table of Contents, of all volumes, and of this volume.
 - 3. Operation and Maintenance Data: Arranged by system, then by product category.
 - a. Source data.
 - b. Product data, shop drawings, and other submittals.
 - c. Operation and maintenance data.
 - d. Field quality control data.
 - e. Original warranties and bonds.
- H. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- I. Provide Operations and Maintenance Manuals to Owner in the following format:
 - 1. Printed Format: One set of operation and maintenance data formatted and organized as specified.
 - 2. Electronic Format: One set of full-color, completed operation and maintenance documents converted into Portable Document Format (PDF) files and stored on USB 3.0 flash drive with an integrated USB interface that is compatible with MS Windows and OSX operating systems.

3.7 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.

- D. Retain warranties and bonds until time specified for submittal.
- E. Submit executed originals of warranties and bonds to Owner for Owner's records.
- F. Include photocopies of executed warranties and bonds converted into Portable Document Format (PDF) files in operation and maintenance manuals, indexed separately on Table of Contents.
- G. Include photocopies of each in operation and maintenance manuals, indexed separately on Table of Contents.

END OF SECTION

SECTION 01 7900
DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

- A. Demonstration of products and systems where indicated in specific specification sections.
- B. Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems, controls, and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems, controls, and equipment.
 - 5. Electronic hardware.
 - 6. Food service equipment.
 - 7. Lighting systems, controls, and equipment.
 - 8. Roofing (warranty requirements).
 - 9. Toilet, bath, and laundry accessories.
 - 10. Other items specified on Drawings or in individual product Sections.
- C. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Finishes, including flooring, wall finishes, ceiling finishes.
 - 2. Food service equipment.
 - 3. Lighting controls.
 - 4. Mechanical equipment and controls.
 - 5. Plumbing fixtures and equipment
 - 6. Other items specified on Drawings or in individual product Sections.

1.2 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Training Plan: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit to Architect for transmittal to Owner.
 - 2. Submit not less than four weeks prior to start of training.
 - 3. Revise and resubmit until acceptable.
 - 4. Provide an overall schedule showing all training sessions.
 - 5. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.
 - g. Media to be used, such a slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.

- C. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.
- B. Owner shall have right to record or video tape demonstration and training sessions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 DEMONSTRATION - GENERAL

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstration may be combined with Owner personnel training if applicable.
- C. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than one week prior to Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than one week prior to Substantial Completion.

3.2 TRAINING - GENERAL

- A. Conduct training on-site unless otherwise indicated.
- B. Provide training in minimum two hour segments.
- C. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- D. Review of Facility Policy on Operation and Maintenance Data: During training discuss:

1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 3. Typical uses of the O&M manuals.
- E. Product- and System-Specific Training:
1. Review the applicable O&M manuals.
 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 6. Discuss common troubleshooting problems and solutions.
 7. Discuss any peculiarities of equipment installation or operation.
 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 10. Review spare parts and tools required to be furnished by Contractor.
 11. Review spare parts suppliers and sources and procurement procedures.
- F. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION

SECTION 02 4100 DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Selective demolition of building elements.

1.2 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.
- C. NFPA 70E - Standard for Electrical Safety in the Workplace; 2018.

1.3 DEFINITIONS

- A. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.
- B. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
- C. Remove and Relocate: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.
- D. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove and deliver to Owner's designated storage area.
- E. Hazardous Materials: Regulated asbestos containing materials, lead, PCB's, and mercury; and biological or other disease-causing agents.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Sequence demolition work in phases as indicated in Section 01 1000 - Summary.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.6 QUALITY ASSURANCE

- A. Demolition work: Comply with requirements of local and Federal authorities having jurisdiction.
 - 1. Pay for fees and permits as may be required by authorities having jurisdiction.
- B. Erosion Control: Comply with requirements of Section 01 5713 - Temporary Erosion and Sediment Control.

1.7 PROJECT CONDITIONS

- A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- B. Materials Ownership: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site.
- C. Visual Requirements: Do not cut and patch exposed construction in a manner that would, in the Architect's opinion, reduce the site's aesthetic qualities.
 - 1. Remove and replace construction cut and patched in a visually unsatisfactory manner.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.1 SCOPE

- A. Remove building elements as indicated.

3.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with other requirements specified in Section 01 7000.
- B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Comply with applicable requirements of NFPA 241.
 - 3. Use of explosives is not permitted.
 - 4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 5. Provide, erect, and maintain temporary barriers and security devices.
 - 6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 8. Do not close or obstruct roadways or sidewalks without permit.
 - 9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 - 10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- C. Do not begin removal until receipt of notification to proceed from Owner.
- D. Do not begin removal until built elements to be salvaged or relocated have been removed.
- E. Protect existing structures and other elements that are not to be removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.

- F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.
- H. Electrical demolition and alterations: Comply with NFPA 70E. Disconnect or shut off service to areas where electrical work is to be removed. Properly lockout and tag equipment and devices. Verify zero-voltage before beginning demolition.
- I. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.
- J. Perform demolition in a manner that maximizes salvage and recycling of materials.
 - 1. Dismantle existing construction and separate materials.
 - 2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
- K. If undocumented, concealed utilities are discovered during removal operations, stop work in the vicinity of the discovery and notify Architect.
 - 1. Upon request, provide Architect with photographs, field measurements, horizontal and vertical locations of the top and/or bottom of utilities referenced from the project survey control datum.
- L. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.3 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

3.4 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 .
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 - 2. Remove items indicated on drawings.
 - 3. Remove exposed abandoned fasteners and supports.
 - 4. Remove materials from assemblies in a manner to prevent damage to assembly components indicated to remain or to be reused.
- E. Services (Including but not limited to HVAC and Electrical): Remove existing systems and equipment as indicated.
 - 1. Request underground utilities to be located and marked within and surrounding construction areas by utility authorities having jurisdiction.
 - 2. Provide temporary utilities and connections as required to maintain safety significant systems required by Owner to remain in service during construction including but not limited to, security, fire alarms, communication, controls, and emergency lighting systems.
 - 3. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
 - 4. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - 5. See Section 01 1000 for other limitations on outages and required notifications.
 - 6. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification.
 - 7. Electrical Distribution Equipment: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide approved closure plates for vacant positions. Tag unused circuits as spare.
 - 8. Unused, concealed conduits may be abandoned in place; remove wiring, provide nylon pull string, and cap each end. Indicate on each end where conduit terminates at end of run.
 - 9. Remove lamps from abandoned luminaires and dispose of in accordance with authorities having jurisdiction.
 - 10. Re-label circuit breakers, switches, and controllers to indicate loads served. Provide new, updated circuit directories where more than three circuits in a panelboard have been modified or rewired.
 - 11. Protect existing work to remain.
 - a. Prevent movement of structure; provide shoring and bracing if necessary.
 - b. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - c. Repair adjacent construction and finishes damaged during removal work.
 - d. Patch as specified for patching new work.
 - e. Protect smoke detectors and HVAC grilles and from dust intrusion.

3.5 REMOVED ITEMS

- A. Refer to Section 01 1000 - Summary for description of items to be salvaged by Contractor.

- B. Items to be removed are indicated on the Drawings.
- C. Installation: Install at location(s) indicated on the Drawings.
- D. Install relocated items as required to match appearance of original location.

3.6 SALVAGED ITEMS

- A. Remove and salvage items as indicated on the Drawings.
 - 1. Record condition of salvaged items prior to removal.
 - 2. Patch and repair salvaged items that become damaged as a result of removal.
 - 3. Remove and store items on-site, at location directed by Owner, for later removal by the Owner:
 - 4. Deliver salvaged items to Owner at on-site location determined by Owner.

3.7 VEGETATION

- A. Install substantial, highly visible fences to prevent inadvertent damage to vegetation to remain.
 - 1. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.
- B. In areas where vegetation must be removed but no construction will occur other than previous paving, remove vegetation with minimum disturbance of the subsoil.
- C. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
 - 1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
 - 2. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 - 3. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
 - 4. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
 - 5. Dead Wood: Remove dead trees (standing or down), limbs, and dry brush on entire site.
- D. Restoration: If vegetation and/or irrigation components outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.8 DEMOLITION, DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site.
- B. Dispose of demolition, debris, junk, and trash in accordance with requirements of authorities having jurisdiction.
- C. Leave site in clean condition, ready for subsequent work.
- D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 03 1000
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Form accessories.
- C. Form stripping.

1.2 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.3 REFERENCE STANDARDS

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- B. ACI 301 - Specifications for Structural Concrete; 2016.
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2016).
- D. ACI 347R - Guide to Formwork for Concrete; 2014.

1.4 SUBMITTALS

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

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.
- B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 PRODUCTS

2.1 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Chamfer outside corners of beams, joists, columns, and walls.
- D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

- E. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

2.2 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor.

2.3 REMOVABLE PREFABRICATED FORMS

- A. Preformed Steel Forms: Minimum 16 gage, 0.0598 inch (1.52 mm) thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- B. Tubular Column Type: Round, composite material, moisture resistant, with smooth interior liner that prevents spiral marks and seams; with stripping filament that allows form to be removed without marring the surface of the column, of sizes indicated.
 - 1. Product Sonotube Finish Free Concrete Form, Sonoco Products Company: www.sonotube.com.
 - 2. Substitutions: See Section 016000 - Product Requirements.

2.4 FORMWORK ACCESSORIES

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, free of defects that could leave holes larger than 1 inch (25 mm) in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
 - 1. Composition: Colorless reactive, mineral oil-based, soy-based, or vegetable-oil based compound.
 - 2. Do not use materials containing diesel oil or petroleum-based compounds.
- C. Filler Strips for Chamfered Corners: Rigid plastic type; 3/4 by 3/4 inch (19 by 19 mm) size; maximum possible lengths.
- D. Dovetail Anchor Slot: Galvanized steel, at least 22 gauge, 0.0299 inch (0.76 mm) thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Flashing Reglets: Galvanized steel, at least 22 gauge, 0.0299 inch (0.76 mm) thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- G. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

- A. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

3.3 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members that are not indicated on drawings.
- F. Coordinate this section with other sections of work that require attachment of components to formwork.
- G. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.4 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, inserts, and components of other work.
- D. Position recessed anchor slots for brick veneer masonry anchors to spacing and intervals specified in Section 04 2613.
- E. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.

- B. Clean formed cavities of debris prior to placing concrete.

3.7 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.8 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.9 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

SECTION 03 2000
CONCRETE REINFORCING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.2 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete; 2016.
- B. ACI SP-66 - ACI Detailing Manual; 2004.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.
- E. CRSI (DA4) - Manual of Standard Practice; 2009.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
 - 1. Plain billet-steel bars.
 - 2. Unfinished.
- B. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.
 - 1. Form: Flat Sheets.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.2 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.

PART 3 EXECUTION

3.1 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as follows:
 - 1. Walls (exposed to weather or backfill): 2 inch (50 mm).
 - 2. Footings and Concrete Formed Against Earth: 3 inch (75 mm).
 - 3. Slabs on Fill: 2 inch (200 mm).

3.2 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION

SECTION 03 3000
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete foundation walls and footings.
- B. Concrete curing.

1.2 REFERENCE STANDARDS

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- B. ACI 301 - Specifications for Structural Concrete; 2016.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- D. ACI 305R - Guide to Hot Weather Concreting; 2010.
- E. ACI 306R - Cold Weather Concreting; 2010.
- F. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
- G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2016).
- H. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016.
- I. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2016b.
- J. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2016a.
- K. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.
- L. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- N. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- O. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2016.
- P. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.
- Q. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.
- R. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
 - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
- D. Test Reports: Submit report for each test or series of tests specified.

1.4 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.1 FORMWORK

- A. Comply with requirements of Section 03 1000.

2.2 REINFORCEMENT MATERIALS

- A. Comply with requirements of Section 03 2000.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I-II Portland type.
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 - 1. Acquire aggregates for entire project from same source.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.4 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- D. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- E. Water Reducing Admixture: ASTM C494/C494M Type A.

2.5 ACCESSORY MATERIALS

- A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Grout: Comply with ASTM C1107/C1107M.
 - 2. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,000 pounds per square inch (13.7 MPa).

2.6 BONDING AND JOINTING PRODUCTS

- A. Latex Bonding Agent: Non-redisersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
- B. Epoxy Bonding System:
 - 1. Complying with ASTM C881/C881M and of Type required for specific application.
- C. Slab Isolation Joint Filler: 1/4 inch (6 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.
- D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel,

2.7 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
- B. Moisture-Retaining Sheet: ASTM C171.
- C. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch (0.102 mm) thick, clear.
- D. Water Fog Spray: Potable, not detrimental to concrete.

2.8 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch (24.2 MPa).
 - 2. Fly Ash Content: Maximum 20 percent of cementitious materials by weight.
 - 3. Cementitious Content: Minimum 520 pounds per cubic yard (320 kg per cu m).
 - 4. Water-Cementitious Ratio: Maximum 50 percent by weight.
 - 5. Total Air Content: 4 - 6 percent, determined in accordance with ASTM C173/C173M.
 - 6. Maximum Slump: 5 inches (125 mm) at point of delivery.

7. Maximum Aggregate Size: 1 inch (25 mm).

2.9 MIXING

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Transit Mixers: Comply with ASTM C94/C94M.
- C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean before applying release agent.
- C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
 - 2. Use latex bonding agent only for non-load-bearing applications.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify Architect not less than 24 hours prior to commencement of placement operations.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- E. Ensure reinforcement, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- F. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

3.4 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R,
 - 1. Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.5 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than seven days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
 - 1. Exposed Slabs and Floors Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water-fog spray.
 - a. Spraying: Fog spray water over floor slab areas and maintain wet.
 - b. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
 - 2. Final Curing: Begin after initial curing but before surface is dry.
 - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches (75 mm) and seal with waterproof tape or adhesive; secure at edges.
 - b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.6 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design to testing firm for review prior to commencement of concrete operations.

- D. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards (76 cu m) or less of each class of concrete placed.
- E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.7 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.8 PROTECTION

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

END OF SECTION

SECTION 03 3511
CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface treatments for concrete floors and slabs.
- B. Liquid densifiers and hardeners.
- C. Clear coatings.
- D. Clear penetrating sealers.

1.2 REFERENCE STANDARDS

- A. ANSI/NSFI B101.1 - Test Method for Measuring Wet SCOF of Common Hard-Surface Floor Materials; 2009.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with concrete floor placement and concrete floor curing.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Manufacturer's Installation Instructions: Indicate special procedures and acceptable installation temperatures.
- D. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the work specified in this section with minimum five years of documented experience; certified by concrete finish equipment and chemical manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.
- B. Store materials in environment recommended on published manufacturer's product data sheets.

1.7 FIELD CONDITIONS

- A. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting performance and finishing requirements
- B. Maintain light level equivalent to a minimum 200 W light source at 8 feet above the floor surface over each 20 foot square area of floor being finished.

- C. Do not finish floors until interior heating system is operational.
- D. Do not allow tape, glue, solvents, cleaners, varnish, non-breathing plastics, adhesives, silicone, plastics, nails, plumbers glue, foam insulation, bond release agents, flux, oils, grease, polyurethane, paint, markers, grease sticks, spray paints, crayons, muriatic acid, and other chemicals to come into contact with slabs both before and after finishing concrete.
- E. Close areas to traffic during floor application and after application for time period recommended in writing by manufacturer.
- F. Maintain ambient temperature of 50 degrees F minimum and 85 degrees F maximum.

PART 2 PRODUCTS

2.1 CONCRETE FLOOR FINISH APPLICATIONS

- A. Unless otherwise indicated, all concrete floors are to be finished using liquid densifier/hardener.

2.2 DENSIFIERS AND HARDENERS

- A. Liquid Densifier/Hardener: Penetrating chemical compound that reacts with concrete, filling the pores and dustproofing; for application to concrete after set.
 - 1. Composition: Sodium Silicate.
 - 2. Traction: Achieve 'High Traction Range' readings when tested in accordance with ANSI B101.1.
 - 3. Number of Coats: Minimum of one.
 - 4. Products:
 - a. PROSOCO, Inc; Consolideck LS/CS: www.prosoco.com/consolideck/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.3 COATINGS

- A. Clear, Penetrating, Moisture Vapor-Resistant Coating: Vapor-resistant and pH-reducing coating recommended by manufacturer for new and existing concrete floors and slabs.
- B. Penetrating Sealer: Transparent, nonyellowing, water-based coating.
 - 1. Composition: Silane-siloxane mixture.
 - a. Sheen: Matte finish, with no gloss or shine.
 - b. Products:
 - 1) Euclid Chemical Company; Baracade WB 244.
 - 2) PROSOCO, Inc; Siloxane PD: www.prosoco.com/consolideck/#sle.

2.4 ACCESSORY MATERIALS

- A. Auto scrubber machine for cleaning operations.
- B. Sealant: Refer to Section 07 9200.
- C. Pre-Densifier Concrete Cleaner: Cleaner to remove dirt, oil, grease, and other stains from existing slab surface.
- D. Cleaning Solution: Mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, pH neutral, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.
- C. Verify that concrete curing materials have been removed from slabs.

3.2 PREPARATION

- A. Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation and other conditions affecting chemical performance.
- B. Clean dirt, dust, oil, grease and other contaminants that interfere with penetration or performance of specified product from surfaces. Use appropriate concrete cleaners approved by the concrete surface treatment manufacturer where necessary. Rinse thoroughly using pressure water spray to remove cleaner residues. Allow surfaces to dry completely before application of product.

3.3 GENERAL

- A. Apply materials in accordance with manufacturer's instructions.

3.4 COATING APPLICATION

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer.
- C. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.
- D. Apply coatings in accordance with manufacturer's instructions.

3.5 PROTECTION

- A. Prohibit the following on finished slabs:
 - 1. Vehicle and equipment parking.
 - 2. Mechanical lifts.
 - 3. Operation of pipe cutting equipment; or equipment with solvents or lubricants.
- B. Do not store products and other materials on slabs.
- C. Protect slabs from contact with paint, acids, and acidic detergents.

END OF SECTION

SECTION 03 3545
POLISHED CONCRETE AND CONCRETE TOPPING - FLOOR SEAL TECHNOLOGY

PART 2 PRODUCTS

1.1 CONCRETE MIX DESIGN

- A. Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 psi, as specified in ACI 301.
 - 2. Water-Cement Ratio: Maximum 45 percent by weight.
 - 3. Total Air Content: Maximum 3 percent, determined in accordance with ACI SPEC-301.
 - 4. Maximum Aggregate Size: 5/8 inch.

END OF SECTION

SECTION 03 4500
PRECAST ARCHITECTURAL CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Architectural precast concrete sills and caps.
- B. Precast concrete splash blocks.

1.2 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- B. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- C. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- D. ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- E. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- F. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; 2013.
- G. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; 2017.
- H. PCI MNL-122 - Architectural Precast Concrete; 2007.
- I. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.
- C. Shop Drawings: Indicate layout, unit locations, configuration, reinforcement, connection details, support items, dimensions, openings, and relationship to adjacent materials. Provide erection drawings.
- D. Proposed Mix Design: Submit proposed mix design including admixtures.
- E. Samples: Submit two concrete samples, 1 by 4 by 4 inches in size, illustrating surface finish, color and texture.
- F. Fabricator's Qualifications: Provide documentation showing precast concrete fabricator complies with Fabricator Qualifications.

1.4 QUALITY ASSURANCE

- A. Perform the work of this Section in accordance with PCI MNL-117 and PCI MNL-122. Perform welding in accordance with AWS D1.1.
- B. Fabricator Qualifications:

1. Firm having at least 5 years of documented experience in production of precast concrete of the type required.
2. Plant certified under at least one of the following for production of architectural precast concrete.
 - a. Plant certified under National Precast Concrete Association.
 - b. Plant certified under Precast/Prestressed Concrete Institute Plant Certification Program; product group and category A1 - Architectural Precast Concrete.
 - c. Plant certified under Architectural Precast Association Plant Certification Program for production of architectural precast concrete.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Precast Concrete Splash Blocks:
1. Aristone Designs, Inc.: www.aristonedesigns.com.
 2. Materials, Inc: materialsinc.com.
 3. Reliance Precast Systems, Inc: www.relianceprecast.com
 4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
- B. White Cement: {rs#1}, Type I, in quantity recommended by manufacturer to meet specified requirements.
- C. Fine and Coarse Structural Aggregates: ASTM C33/C33M.
- D. Color Additives: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979/C979M.
1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
 2. Color(s): Refer to Schedule at the end of this Section.
- E. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.
- F. Fiber Reinforcement: Synthetic fiber shown to be resistant to long-term deterioration when exposed to moisture and alkalis; 3/4 inch length.
- G. Grout:
1. Non-shrink, non-metallic, minimum 10,000 psi, 28 day strength.

2.3 FABRICATION

- A. Fabricate in compliance with PCI MNL-117 and PCI MNL-135.
- B. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and finish.
- C. Maintain consistent quality during manufacture.
- D. Embed reinforcing steel in formed units.
- E. Form sills and caps into size and profile indicated.
1. Slot: Provide slot on underside of precast units indicated to receive dowels; terminate slots 4 inches minimum from exposed ends.

2. Drips: Provide continuous formed reveal drip as indicated at window sills; if not indicated, provide formed reveal drip 1/2 by 1/2 inches, on underside of unit, located 1-1/2 inches minimum from exterior face.
 - a. Drips fabricated by sawcutting are not acceptable.
3. Precast Unit Lengths: Provide as indicated; if not indicated, provide units as follows:
 - a. Precast window sills:
 - 1) Units at wall openings 60 inches or less: Provide single precast unit.
 - 2) Units at wall openings greater than 60 inches: Provide units of same length with no units less than 36 inches.
- F. Precast Concrete Splash Blocks: Form units into size and profile indicated, with reinforcing and sloped surface to provide positive drainage away from walls.
 1. Size: As indicated on Drawings; if not indicated provide the following:
 - a. Splash blocks on roofs beneath downspouts, scuppers, and roof drain outlets: 24 inches wide by 32 inches long by 4-1/2 inches high, minimum.
 - b. Splash blocks on ground beneath downspouts: 24 inches wide by 32 inches long by 4-1/2 inches high, minimum.
 - c. Other splash blocks, unless shown otherwise: 24 inches wide by 32 inches long by 4-1/2 inches high, minimum.
- G. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
- H. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.

2.4 FINISH - PRECAST UNITS

- A. Exposed-Face Surface Finish: Smooth form finish free of pockets, sand streaks, and honeycombs, with uniform color and texture.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that building structure, anchors, devices, and openings are ready to receive work of this section.

3.2 PREPARATION

- A. Provide for erection procedures and induced loads during erection. Maintain temporary bracing in place until final support is provided.

3.3 ERECTION

- A. Erect units without damage to shape or finish. Replace or repair damaged units.
- B. Erect units level and plumb within allowable tolerances.
- C. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise Architect.
- D. Fasten units in place with mechanical connections where indicated.
- E. Exposed Joint Dimension: 1/4 inch. Adjust units so that joint dimensions are within tolerances.

3.4 PRECAST UNITS

- A. Install units as indicated with units parallel with walls.
 - 1. Lay sills and copings with two dowels per unit; set dowels in substrate with non-shrink grout.
 - 2. Substrates with sheet metal flashings: Seal dowel penetrations through sheet metal with sealant specified in Section 07 9200 - Joint Sealants.
- B. Splash Blocks:
 - 1. Provide splash blocks at downspouts that discharge directly onto soil whether indicated on the Drawings or not.
 - 2. Unless indicated otherwise, set splash blocks with high end of splash blocks against exterior wall of building.
 - 3. Align centerline of splash blocks with centerline of downspouts.
 - 4. Splash blocks on roofing:
 - a. Provide splash blocks at downspouts, scuppers, and roof drain outlets that discharge onto roofs whether indicated on the Drawings or not.
 - b. Install center of splashblocks on centerline of downspouts, scuppers, and roof drain outlets.
 - c. Adhere splash blocks to cushion sheet with adhesive.

3.5 TOLERANCES

- A. Erect members level and plumb within allowable tolerances. Comply with PCI MNL-135, except as specifically amended below.
 - 1. Plan Location from Building Grid Datum: Plus or minus 1/4 in.
 - 2. Top Elevation from Nominal Top Elevation: Plus or minus 1/4 inch.
 - 3. Exposed Joint Dimension: Plus or minus 1/8 inch.
 - 4. Maximum Jog in Alignment of Matching Faces or Edges: Plus or minus 1/8 inch.
 - 5. Maximum Variation from Plane of Location: 1/4 inch in 10 feet, and 3/8 inch in 100 feet, non-cumulative.

3.6 CLEANING

- A. Clean precast units to remove mortar, dirt, stains, and discolorations.

3.7 PROTECTION

- A. Protect installed precast units from subsequent construction operations.

3.8 SCHEDULE

- A. Precast Units:
 - 1. Precast Window Sills:
 - a. Color and Joint Width Between Units: Match precast window sills located in exterior CMU walls at Mettie Jordan Elementary School, Eunice, New Mexico.
 - 2. Precast Pier Caps:
 - a. Color: Match color of precast window sills.

END OF SECTION

SECTION 05 1200
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural steel framing members and support members.
- B. Base plates, and headed studs.
- C. Grouting under base plates.

1.2 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

1.3 REFERENCE STANDARDS

- A. AISC (MAN) - Steel Construction Manual; 2017.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
- E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2018.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.
- G. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021.
- H. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.
- I. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.
- J. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- M. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- N. SSPC-SP 3 - Power Tool Cleaning; 2018.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.

2. Connections.
3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

1.5 QUALITY ASSURANCE

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Fabricator: Company specializing in performing the work of this section with minimum 3 years of documented experience.
- C. Erector: Company specializing in performing the work of this section with minimum 3 years of documented experience.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Angles, Plates, Channels, S Shapes, and M Shapes: ASTM A36/A36M.
- B. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- C. Pipe: ASTM A53/A53M, Grade B, Finish black.
- D. Headed Studs: Made from ASTM A 108 Grade 1015 bars.
- E. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563/A563M nuts and ASTM F436/F436M washers.
- F. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563/A563M nuts and ASTM F436/F436M Type 1 washers.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Non-shrink grout: As specified in Section 03300.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.2 FABRICATION

- A. Shop fabricate to greatest extent possible.
- B. Headed studs: As detailed.
- C. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- D. Fabricate connections for bolt, nut, and washer connectors.
- E. Waterjet-cut Graphics: Refer to Section 05 5000 - Metal Fabrications.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC-SP 3.
- B. Shop prime structural steel members. Do not prime surfaces that will be field welded, in contact with concrete, or high strength bolted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.2 ERECTION

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components indicated on drawings.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
- E. Do not field cut or alter structural members without approval of Architect.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.3 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 05 5000
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. The following shop fabricated steel items, including:
 - 1. Miscellaneous shapes.
 - 2. Slotted Channel Framing Components.
 - 3. Anchors, Stud Anchors, Expansion Anchors, and Miscellaneous Fasteners.

1.2 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2020.
- K. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.
- L. ASTM E488/E488M - Standard Test Methods for Strength of Anchors in Concrete Elements; 2018.
- M. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- N. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- O. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata.
- P. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- Q. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

R. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for the following.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

1.4 QUALITY ASSURANCE

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Bars: ASTM A 36/A 36M.
- D. Plates: ASTM A283/A283M.
- E. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- F. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- G. Slotted Channel Fittings: ASTM A1011/A1011M.
- H. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- I. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- J. Concrete Screws: Carbon steel, heat treated and zinc plated with baked-on ceramic coating, sizes as indicated, with hex head.
- K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- L. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- M. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 SLOTTED CHANNEL FRAMING MATERIALS

- A. Slotted Channel Framing System: Capability to sustain, without failure, imposed loads; consisting of channels, angles, tubes, and accessories as recommended by manufacturer for application indicated.
 - 1. Slotted channels: Fabricated from structural steel complying with the referenced standards.

2. Fittings: Manufacturer's standard nuts, bolts, washers, clamps, hangers, plates, fittings, brackets, threaded rod, inserts, splices, and other fabrications as recommended by manufacturer.
- B. Finish components in accordance with one of the following:
 1. Exterior Locations (any of the following):
 - a. Electrolytically zinc coated per ASTM B633, Type III SC 1.
 - b. Zinc-coated by the hot-dipped process prior to roll-forming, G90 conforming to ASTM A653/A653M.
 - c. Zinc coated after all manufacturing, conforming to ASTM A123/A123M.
 - d. Fittings: ASTM A153/A153M, hot-dipped galvanized.
 2. Interior Locations:
 - a. Plain finish, oiled, including fittings.
 - b. Any finish specified for exterior locations.

2.3 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.4 FABRICATED ITEMS

- A. Miscellaneous metal fabrications: As detailed.

2.5 ANCHORS

- A. Anchors with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E488/E488M, conducted by a qualified independent testing agency; designed for use in concrete and masonry.
 1. Expansion Anchors: Stud type expansion anchor, with single piece wedge.
 - a. Material, interior locations: Zinc plated carbon steel.
 - b. Material, exterior locations and interior locations subject to moisture: Stainless steel.

2.6 FINISHES - STEEL

- A. Prime paint steel items.
 1. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
 1. Provide shop primer compatible with specified field-applied topcoats.
- E. Finish Painting: Refer to Section 09 9000.

2.7 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation from Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Examine the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed .
- G. Slotted Channel Framing Components: Install in accordance with manufacturer's recommendations.
- H. Anchors: Provide anchorage devices and fasteners where necessary for securing metal fabrications; including, but not limited to: chemical anchors, expansion anchors, threaded inserts, toggle bolts, through-bolts, dowels, threaded rod, lag-bolts, and anchor bolts, and other connections as required to provide for loads; Install in accordance with manufacturer's instructions.

3.4 TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.5 CLEANING

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Provide final protection and maintain conditions that ensure metal fabrications work during construction is without damage or deterioration other than natural weathering.
- C. Protect installed metal surfaces from subsequent construction operations.

END OF SECTION

SECTION 06 1000 ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concealed wood blocking and plywood for support of wall mounted equipment and fixtures.
- B. Miscellaneous blocking and wood nailers.
- C. Anchorage devices and fasteners.

1.2 REFERENCE STANDARDS

- A. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. PS 20 - American Softwood Lumber Standard; 2020.

1.3 SUBMITTALS

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

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Western Woods, unless otherwise indicated.
 - 2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.2 DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.3 ACCESSORIES

A. Fasteners and Anchors:

1. Concealed blocking and nailers in walls and ceilings:
 - a. Light gage steel substrate: Type S, bugle head, sharp point, fine thread, length to achieve full penetration of substrate.
 - b. Heavy gage steel substrate: Type S-12, wafer head, self-tapping, length to achieve full penetration of substrate.
2. Metal and finish: Hot-dipped galvanized steel complying with ASTM A153/A153M
3. Anchor Bolts: ASTM A307 galvanized to ASTM A 153/A 153M for galvanized components; sizes as indicated with L-shaped embedment leg.

PART 3 EXECUTION

3.1 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide concealed nailers and blocking as indicated or as required to support fixtures, equipment, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide concealed, non-structural framing and blocking, whether indicated or not, at locations including, but not limited to, the following:
1. Casework.
 2. Ceiling-mounted equipment.
 3. Countertops.
 4. Fire extinguishers.
 5. Grab bars.
 6. Owner-furnished, Owner-installed items specified in Section 01 6400.
 7. Owner-furnished, Contractor-installed items specified in Section 01 6400.
 8. Toilet and bath accessories.
 9. Wall-mounted door stops.
 10. Wall-mounted equipment.

3.4 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

- A. Install nailers where shown and where required for attaching other work. Attach to substrates to support applied loading. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Recess fasteners flush with surfaces, unless otherwise indicated.
- C. Exposed nailers and blocking at interior locations: Not allowed.

3.5 TOLERANCES

- A. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.6 CLEANING

- A. Comply with applicable regulations.
- B. Do not burn scrap on project site.
- C. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- D. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 8316
FIBERGLASS REINFORCED PANELING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fiberglass reinforced plastic panels.
- B. Trim.
- C. Base.

1.2 REFERENCE STANDARDS

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).
- B. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor; 2013a.
- C. ASTM D570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2018).
- D. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.
- E. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between - 30 C and 30 C with a Vitreous Silica Dilatometer; 2016.
- F. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.
- G. ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement; 2020.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2022.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
 - 1. Adhesive: Provide VOC content.
- C. Samples: Submit two samples 3 by 3 inch in size illustrating material and surface design of panels.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design - Fiberglass Reinforced Plastic Panels: Standard FRP S100G White as specified herein and manufactured by Marlite: www.marlite.com.
 - 1. Other acceptable manufacturers:
 - a. Crane Composites, Inc: www.cranecomposites.com.
 - b. Nudo: www.nudo.com.
 - 2. Substitutions: Not permitted.

2.2 MATERIALS

- A. Kitchen Panels: Fiberglass reinforced plastic (FRP), USDA approved for incidental food contact.
 - 1. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class I/A when tested in accordance with ASTM E84.
 - 2. Color: Bright White.
 - 3. Thickness: 3/32 inch (0.090 inch), nominal.
 - 4. Width: 48 inches.
 - 5. Length: Full height of wall, one piece, without horizontal seams.
 - 6. Product: Standard FRP S 100G White, Class A, Marlite.
- B. Restroom and Corridor Panels: Glass fiber reinforced plastic (FRP).
 - 1. Surface Burning Characteristics: Flame spread index of 200 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84, (Class C/III).
 - 2. Surface Texture: Gently pebbled, high-gloss.
 - a. Corridor Color: White
 - 3. Thickness: 3/32 inch, nominal.
 - 4. Width: 48 inches.
 - 5. Length: 48 inches.
 - 6. Flexural Strength: 17,000 psi, when tested in accordance with ASTM D790.
 - 7. Flexural Modulus: 600,000 psi, when tested in accordance with ASTM D790.
 - 8. Tensile Strength: 8,000 psi, when tested in accordance with ASTM D638.
 - 9. Tensile Modulus: 9,430 psi, when tested in accordance with ASTM D638.
 - 10. Barcol Hardness: 40, when tested in accordance with ASTM D2583.
 - 11. Impact Resistance: 7 ft-lb/in, when tested in accordance with ASTM D256, Izod method.
 - 12. Coefficient of Thermal Expansion: 0.0000157 in/in/degree F, measured in accordance with ASTM D696.
 - 13. Water Absorption: 0.17 percent, when tested in accordance with ASTM D570.
 - 14. Specific Gravity: 1.53, when tested in accordance with ASTM D792.
- C. Trim: Vinyl, factory-made extruded terminations, corners, and splices that seal panel system; as required by manufacturer to meet project conditions.
- D. Restroom and Corridor Trim: Anodized Aluminum, factory-made extruded terminations, corners, and splices that seal panel system; as required by manufacturer to meet project conditions.
- E. Kitchen Base: Panel manufacturer's rigid extruded PVC; with horizontal flange designed to allow wall panels to lap over.
 - 1. Height: 3 inches.
 - 2. Color: White.
 - 3. Locations: Provide at base of wall-mounted panels that extend to floor.

4. Product: Base Cove V65, Marlite.
- F. Restroom and Corridor Base: Panel manufacturer's rigid extruded PVC; with horizontal flange designed to allow wall panels to lap over.
 1. Height: 4 inches.
 2. Color: Black.
 3. Locations: Provide at base of wall-mounted panels that extend to floor.
 4. Product: Base Cove V65, FRP Base Molding, Marlite.
- G. Corner Guard:
 1. Height: Matching Panel Height.
 2. Finish: Stainless Steel.
 3. Product: F560SS, Stainless Steel Corner Guard, Marlite.
- H. Adhesive: Non-flammable, water-based, construction adhesive designed for installing FRP panels over substrates indicated, as recommended by manufacturer.
- I. Sealant: As specified in Section 07 9200.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section.

3.2 PREPARATION

- A. Take panels out of cartons and allow to acclimatize to room conditions for at least 48 hours prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces thoroughly prior to installation.
- D. Protect existing surfaces from damage due to installation.

3.3 INSTALLATION - WALLS

- A. Install panels in accordance with manufacturer's instructions.
- B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.
- C. Install base with adhesive and concealed stainless steel screws or nails, as required for firm attachment to substrate.
- D. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.
- E. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
- F. Install panels with manufacturer's recommended gap for panel field and corner joints.
- G. Roll panel surface to ensure complete contact.
 1. If necessary, install bracing to maintain intimate contact until adhesive cures in accordance with manufacturer's instructions.

- H. Place trim on panel before fastening edges, as required.
- I. Fill channels in trim with sealant before attaching to panel.
- J. Install trim with adhesive and concealed stainless steel screws or nails, as required for firm attachment to substrate.
- K. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
 - 1. Seal corner seams, base junctures; around door frames, wall-mounted fixtures and other openings; at tops of wainscots, wall terminations; and between penetrating items and panel cut-outs.
- L. Remove excess sealant after paneling is installed and prior to curing.

3.4 TOLERANCES

- A. Length and Width: 1/8 inch (+/-).
- B. Square: Not to exceed 1/8 inch for 96 inch panels or 5/32 inch for 120 inch panels.

3.5 CLEANING

- A. Clean panel faces using clean rags and cleaning agents recommended by manufacturer to remove soiling, stains, dust, and dirt.

3.6 PROTECTION

- A. Protect installed interior paneling from subsequent construction operations.

END OF SECTION

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Insulation finishing system for use in pre-engineered metal buildings.
- B. Blanket insulation in exterior wall construction.

1.2 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2021.
- C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- D. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics; 2016.
- E. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C; 2019a.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics and performance criteria.
- C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- D. Manufacturer's Installation Instructions for Insulation Finishing System: Include manufacturer's required methods of installation.
- E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of contractor accreditation and installer certification on project site during and after installation. Present on-site documentation upon request.
- G. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years documented experience.
- B. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:
 - 1. Installer Qualification: Use accredited contractors, certified installers, evaluated materials, and third-party field quality control audit.

2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.
- C. Air Barrier Association of America (ABAA) Evaluated Materials Program (EAP); www.airbarrier.org/#sle: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.5 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Insulation Finishing System Warranty: Warranted against manufacturing defects in materials for 10 years.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Refer to Drawings and Schedule at the end of this Section.

2.2 BOARD INSULATION MATERIALS

- A. Cellular Polyurethane Thermal Break Board Insulation: High-strength closed-cell structure board with following characteristics.
 1. Thermal Resistance: R-value of 3.85 per inch, minimum, at 75 degrees F, minimum, in accordance with ASTM C518 test methods.
 2. Apparent Thermal Conductivity: K-value of 0.26 Btu inch/hr sq ft degrees F, minimum, in accordance with ASTM C518 test methods.
 3. Compressive Strength: 210 psi, minimum, in accordance with ASTM D1621 test methods.
 4. Compressive Modulus: 6,155 psi, minimum, in accordance with ASTM D1621 test methods.

2.3 BLANKET INSULATION MATERIALS

- A. Glass Fiber Blanket Insulation: Flexible preformed blanket, complying with ASTM C665; friction fit.
 1. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
 2. Facing: Refer to Schedule at the end of this Section.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of irregularities.
- C. Verify penetrations, protrusions, or interruptions to the insulation plane.

3.2 BLANKET INSULATION INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install insulation without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap flanges of membrane between framing members.
- F. Staple or nail facing flanges in place at maximum 6 inches on center.
- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

3.3 CLEAN-UP

- A. Remove and dispose of excess insulation, wrappings and other waste materials.

END OF SECTION

SECTION 07 2600 VAPOR RETARDERS

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.

1.2 DEFINITIONS

- A. Vapor Retarder: Airtight barrier made of material that is relatively water vapor impermeable, to degree specified, with seams and joints sealed to adjacent surfaces.
- B. Vapor Retarder Class: A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class is defined using Procedure A, Desiccant Method at 73 degrees F and 50 percent Relative Humidity (RH), in accordance with ASTM E96/E96M and ICC (IBC)-2018, as follows:
 - 1. Class I: 0.1 perm or less.

1.3 REFERENCE STANDARDS

- A. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.
- B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- C. ICC (IBC)-2018 - International Building Code; 2018.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 VAPOR RETARDERS

- A. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
- B. Vapor Retarder Class: Class 1.
- C. Thickness: 15 mils, minimum.
- D. Water Vapor Permeance: 0.03 perms, maximum.

2.2 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Vapor Retarder and Adjacent Substrates: As indicated, complying with vapor retarder manufacturer's installation instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Vapor Retarders: Install continuous airtight barrier over surfaces indicated, with sealed seams and sealed joints to adjacent surfaces.
- C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

3.4 FIELD QUALITY CONTROL

- A. Do not cover installed vapor retarders until required inspections have been completed.
- B. Take digital photographs of each portion of installation prior to covering up vapor retarders.

3.5 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 4113
METAL ROOF PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal roof panel system of preformed steel panels.

1.2 DEFINITIONS

- A. Substantial completion of roofing work is defined as the contractually required and weathertight installation of roof system including specified roof panels, flashings, counterflashings, gutters, and downspouts.

1.3 REFERENCE STANDARDS

- A. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.
- B. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- D. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).
- E. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- F. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
- G. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference; 2005 (Reapproved 2017).
- H. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate metal roof panels work with gutters and downspouts specified in Section 07 7123.
 - 2. Coordinate metal roof panels work with metal building specified in Section 13 3419.
- B. Provide required notifications and secure inspections required by manufacturer of the approved materials to facilitate issuance of the specified warranties.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Manufacturer's recommended methods of installation.

- C. Manufacturer's approved recommended methods of installation, unless superseded by more stringent requirements in the Contract Documents, will become the basis for inspecting, and acceptance or rejection of the actual installation procedures used in this Work.
- D. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Roof panels including finish and color.
 - 2. Roof panel clips and bearing plates, if required.
 - 3. Fasteners.
 - 4. Storage and handling requirements and recommendations.
 - 5. Installation methods.
 - 6. Specimen warranty.
- E. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
 - 1. Show work to be field-fabricated or field-assembled.
 - 2. Show panels, flashings, and closures.
 - 3. Show sealant or sealant tape, as recommended by panel manufacturer, at side joints.
- F. Wind Uplift Information: Provide documentation from manufacturer that roofing system has been tested as a complete system to meet uplift resistance specified.
- G. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.
- H. Verification Samples: For each roofing system specified, submit samples of minimum size 3 inches square, representing actual roofing metal, thickness, profile, color, and texture.
- I. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
 - 1. Installer must have successfully installed the specified system at least once and within five years prior to bid date of this Project.
 - 2. Installer must be certified by roof panel manufacturer.
 - 3. Subcontracting the installation of roof system components to an individual or a firm that is not a full-time employee of the installer's company is prohibited.
- B. Securement: Provide in accordance with ANSI/SPRI/FM 4435/ES-1.
- C. Asbestos or asbestos-related products: Not allowed.
- D. Size and fabricate roof systems free of distortion or defects detrimental to appearance or performance.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.
 - 1. Store materials in dry, raised, protected areas in an upright position; Control temperature of storage areas in accordance with manufacturer's instructions; Protect materials from exposed to the elements.

- B. Mark wet, damaged, or defective materials intended for incorporation into the roofing system; remove from the site the same day as discovered.

1.8 WARRANTY

- A. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 30 years from date of Substantial Completion.
- B. Special Warranty: Provide twenty warranty for weathertightness of roofing system, including agreement to repair or replace metal roof panels that fail to keep out water commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design - Metal Roof Panels: Double-Lok 24 Galvalume Plus panels as specified herein and manufactured by MBCI Metal Roof and Wall Systems, Division of NCI Group: www.mbc.com.
 - 1. Other acceptable products:
 - a. 3" Trapezoidal Panel, Bridgers Steel: www.bridgersteel.com.
 - b. Nucor Vice Lock 360 Seam Roof System, Nucor Building Systems: www.nucorbuildingsystems.com.
 - c. MR-24 Roof System, Butler Manufacturing Co: www.butlermfg.com.
 - d. SSR Standing Seam Roof, Varco Pruden Buildings, Division of BlueScope Buildings North America, Inc: www.vp.com.
 - e. Double-Lok 24, Star Building Systems, an NCI Company: www.starbuildings.com.
 - f. AS-24 QuadLok Panel, Alliance Steel, Inc: www.allianceoke.com.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Metal Roof Panels: Provide complete roofing assemblies, including roof panels, clips, fasteners, connectors, and miscellaneous accessories, tested for compliance with the following minimum standards:
 - 1. Structural Design Criteria: Provide panel assemblies designed to safely support design loads at support spacing indicated, with deflection not to exceed L/180 of span length(L) when tested in accordance with ASTM E1592.
 - a. Live Loads: As required by ASCE 7.
 - 2. Overall: Complete weathertight system tested and approved in accordance with ASTM E1592.
 - 3. Wind Uplift: Class 90 wind uplift resistance of UL 580.

2.3 METAL ROOF PANELS

- A. Metal Roof Panels: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Panels: Factory-formed panels with factory-applied finish.

1. Metal Panels:
 - a. Aluminum-zinc alloy-coated steel complying with ASTM A792/A792M; minimum AZ50 coating.
 - b. Thickness: Minimum 0.025 inch.
 2. Profile: Standing seam, trapezoidal leg with minimum 3 inch seam height; concealed fastener system for field seaming with special tool.
 3. Texture: Match existing.
 4. Width: Maximum panel coverage of 18 inches.
 - a. Minimum panel width: 16 inches.
- C. Metal Panels: Standing seam, concealed fastener system, with profile consisting of center stiffening rib between two pencil beads; for field application of seam cap with special tool.
1. Seam Height: 2-3/8 inches.
 2. Seam Caps: Factory-formed, 1 inch wide, with two continuous beads of gasketing sealant.
 3. Color: Series 300, Cardinal Red.

2.4 ATTACHMENT SYSTEM

- A. Metal Roof Panels: Two Piece Floating Clips: ASTM C645, with ASTM A653/A653M, G90 (Z180) hot-dip galvanized zinc coating, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.
- B. Fasteners: Provide types recommended by manufacturer to suit application.
1. Concealed fasteners: Corrosion resistant self-tapping screws.
 - a. Where exposed fasteners cannot be avoided provide self-tapping stainless steel screws with EPDM or neoprene gaskets, with coated heads matching panel color.

2.5 SECONDARY FRAMING

- A. Miscellaneous Secondary Framing: Light gauge steel framing incidental to structural supports; fabricated from steel sheet.
- B. Framing Material: ASTM A1011/A1011M Designation SS steel sheet.
1. Profile: Manufacturer's standard cee, zee, asymmetrical zee, hat channel, plain channel, and angle.
 2. Thickness: 12 gauge, 0.1046 inch.
 3. Finish: Galvanized per ASTM A653/A653M, G90.
- C. Framing Connectors: Factory-made formed steel sheet, ASTM A653/A653M SS Grade 50, with G60/Z180 hot dipped galvanized coating and factory punched holes.

2.6 FABRICATION

- A. Panels: Provide factory fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
- B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.7 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Provide flashings, trim, moldings, and closure strips of the same material, thickness, and finish as used for the panels. Items completely concealed after installation may optionally be made of stainless steel.
- B. Ridge Cap: Manufacturer's formed metal ridge flashing with hemmed drips of same material and finish as roof panels, designed to prevent wind-driven moisture from entering attic space.
- C. Rib and Ridge Closures: Provide prefabricated, close-fitting components of same metal and finish as roof panels.
- D. Pipe Flashing: As specified in Section 07 7200.
- E. Exposed Sealants: As specified in Section 07 9200 - Joint Sealants.
- F. Light Panels: Manufacturer's standard translucent panels, designed for weathertight installation as part of the pre-engineered roof assembly.
 - 1. Panel: Roof panel manufacturer's standard fiberglass reinforced, insulated, white translucent plastic panels, designed to maintain weathertightness, UL 90 rating, and compliant with roof warranty specified.
 - 2. Profile: Match roof panel profile.
 - 3. Nominal Size: 36 x 96 inches single unit.
 - 4. Product and Manufacturer: HW-Series Light Transmitting Panel, MBCI: www.mbc.com or approved equal.
- G. Gutters and Downspouts: As specified in Section 07 7123 - Manufactured Gutters and Downspouts.
- H. Bituminous Paint: Waterborne asphalt emulsion type.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrate and conditions under which roofing work is to be performed notify the Architect and Owner immediately of unsatisfactory conditions.
 - 1. Do not proceed with roofing work until unsatisfactory conditions have been corrected in a manner acceptable to Architect, installer and manufacturer.
- B. Verify penetrations have been laid out and securely installed with adequate vertical and horizontal clearance required by the manufacturer to provide the specified warranty.
- C. Verify substrate is supported and secure.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Verify substrate surfaces are dry and free of snow or ice.
- F. Ensure that fasteners will not penetrate conduit or other miscellaneous items located on the underside of the roof sheathing.
- G. Do not start application until defects have been corrected.

3.2 PREPARATION

- A. Protect adjacent areas from damage with tarps or other durable materials.
- B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to ensure that completed roof will be free of leaks.
- C. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by panel manufacturer.
- D. Protect surrounding areas and adjacent surfaces from damage during execution of this work.
- E. At locations where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.3 INSTALLATION

- A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
 - 1. Install roofing system with concealed clips and fasteners.
 - 2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of friction plates or torches for field cutting is prohibited.
 - 3. Do not apply roofing materials when water in any form (i.e. rain, dew, ice, frost, snow, etc.) is present.
 - 4. Do not apply roofing during inclement weather or when ambient conditions will not allow proper application. Consult manufacturer's technical specifications on cold weather application.
- B. Perform work on a daily basis with each section completed before progressing to the next day's work, unless specifically directed otherwise by the Architect.
- C. Install flashings concurrently with the roofing panels as the job progresses.
 - 1. Attach panel flashing components to supports using manufacturer's recommended fasteners.
 - 2. Temporary flashings are prohibited without written prior approval by the Architect.
 - 3. Remove and replace areas where water has entered under newly completed roofing due to incomplete flashings or seams at no cost to the Owner.
- D. Cut panels, trim, and other metal components in field where required using manufacturer's recommended methods.
- E. Hoist panels in accordance with manufacturer's recommendations.
- F. Accessories: Install all components required for a complete roofing assembly, including flashings, trim, and moldings.
 - 1. Install accessories in accordance with manufacturer's recommendations for positive anchorage to building and weathertight mounting.
- G. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
 - 1. Form weathertight standing seams according to manufacturer's requirements.
 - 2. Provide concealed sealant tape or other approved joint sealer at closures, trim, flashings, and other components as recommended by manufacturer.
 - 3. Install sealant or sealant tape, as recommended by panel manufacturer, at side joints.

- H. Ridge Caps, Ridge Vents, Closure Pieces, and Trim: Secure with stainless steel pop rivets with painted matching heads where fasteners will be exposed.
- I. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer

3.4 TOLERANCES

- A. Roofing and Trim: 1/8 inch from true position.

3.5 CLEANING

- A. Perform cleaning in accordance with manufacturer's recommendations.
- B. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.
- C. Remove markings from finished surfaces.
- D. Cracking, splitting, peeling, blistering or other damage to panel coating is not acceptable.
- E. Repair or replace defaced or disfigured finishes.

3.6 PROTECTION

- A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- B. Protect building surfaces, rooftop mounted equipment, piping, conduit, etc., against damage from roofing work. Where traffic must continue over finished roof panels, protect surfaces.
- C. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION

SECTION 07 4213
METAL WALL PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manufactured metal panels for walls, with liners, related flashings, and accessory components.
- B. Metal liner panels.

1.2 REFERENCE STANDARDS

- A. AAMA 800 - Voluntary Specifications and Test Methods for Sealants; 2016
- B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).
- C. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2016.
- D. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007 (Reapproved 2015).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate metal wall panels work with coping work specified in Section 07 7100 - Roof Specialties.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
 - 1. Technical data on panel profile, material, finish, fasteners, trim, and installation requirements.
 - 2. Physical characteristics of components shown on shop drawings.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation instructions and recommendations.
- C. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.
 - 1. Identify connections to framing components.
 - 2. Identify fasteners, trim and closures.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit two samples, minimum 3 x 3 inch in size illustrating color and pattern for each product specified.
- F. Installer's qualification statement.
- G. Warranty Documentation: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

- H. Selection Samples: For each wall panel system specified, submit color chips representing manufacturer's full range of available colors and patterns, 4 inches long by 4 inches wide, illustrating finish color, sheen, and texture.
- I. Samples for Verification: Submit two samples of each type of panel, 4 inches long by 4 inches wide, illustrating actual finish color, sheen, and texture.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years of documented experience.
- B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum three years of documented experience and approved by manufacturer.
- C. Flashing, Trim, and Closures: Manufactured by the wall panel manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

1.7 FIELD CONDITIONS

- A. Do not install wall panels when air temperature or relative humidity are outside manufacturer's limits.

1.8 WARRANTY

- A. Metal Wall Panel Warranty: Provide manufacturer's warranty against rupture, structural failure, or perforations within a period of 20 years from date of shipment due to exposure to normal atmospheric corrosion.
- B. Liner Panel Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling.
 - 1. Film Integrity: Panel will not crack, check, or peel for a period of 40 years.
 - 2. Chalking and Fading: Panel will not chalk or fade for a period of 30 years.
 - a. Chalking Resistance: Freedom from chalking in excess of numerical rating of 8 for vertical panel applications or numerical rating of 6 for non-vertical panel applications when measured in accordance with ASTM D4214.
 - b. Color Change: Freedom from color fading in excess of 5 color difference units for vertical panel applications or 7 color difference units for non-vertical panel applications when tested in accordance with ASTM D2244.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design - Metal Wall Panels - Exposed Fasteners: 7.2 Panel with Galvalume Plus finish, as specified herein and manufactured by MBCI: www.mbc.com.

1. Other Acceptable Manufacturers:
 - a. Berridge Manufacturing Company; Deep-Deck Panel: www.berridge.com/sle.
 - b. Bridger Steel; 7.2 Structural Box Rib: www.bridgersteel.com.
 - c. Innovative Metals Company, Inc; 7.2 Rib Exposed Fastener Metal Wall System: www.imetco.com.
 - d. Firestone Building Products Company; Una-Clad VR-Classic Omega: www.firestonebpco.com.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.2 METAL WALL PANEL SYSTEM

- A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
 1. Provide exterior panels and interior liner panels.
 2. Panel Attachment: Exposed fastening system.
 3. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
 4. Design Pressure: In accordance with applicable codes.
 5. Maximum Allowable Deflection of Panel: $L/180$ for length(L) of span.
 6. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
 7. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
 8. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
 9. Corners: Factory-fabricated in one continuous piece with minimum 3 inch returns with hemmed edges; designed for attachment with exposed fasteners.
- B. Metal Wall Panels:
 1. Orientation: Vertical.
 2. Profile: Formed, equally-spaced, trapezoidal ridges.
 3. Seams: Lapped, tight-fitting, sealed with continuous field applied tape sealant at sidelaps and endlaps.
 4. Panel Coverage Width: 36 inches.
 5. Rib Height: 1-1/2 inches.
 6. Rib Spacing: 7.2 inches.
- C. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; brake formed to required angles.

2.3 INTERIOR LINER PANELS

- A. Basis of Design - LIner Panels: Masterline 16 as specified herein and manufactured by MBCI Metal Roof and Wall Systems, Division of NCI Group: www.mbc.com.
 1. Color: Snow White.
 2. Other acceptable manufacturers: Manufacturer of metal liner panels must be the same manufacturer as the manufacturer of metal wall panels.
- B. Fasteners: Concealed panel cleats and fasteners.

- C. Panel Orientation: Horizontal.
- D. Profile: 7/8 inch deep, trapezoid-shaped corrugations.
- E. Side Seams: Lapped, unsealed.
- F. Internal and External Corners: Same material, thickness, and finish as liner panels; profile to suit system; brake formed to required angles.
- G. Trim: Manufacturer's standard brake formed type; same material, thickness, and finish as adjacent cladding, profile to suit system.

2.4 MATERIALS

- A. Precoated Steel Sheet for Metal Wall Panels: Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, Commercial Steel (CS)) or Forming Steel (FS), with AZ50/AZM150 coating; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.
 - 1. Thickness: Minimum 0.025 inch.
 - 2. Finish Texture: Smooth.
 - 3. Color: Galvalume with clear acrylic coating.

2.5 ACCESSORIES

- A. Flashing and Trim: Match material, thickness, and finish of metal panels.
- B. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
- C. Coat concealed surfaces of flashings in contact with concrete with bituminous paint.
- D. Exposed Sealants: As specified in Section 07 9200 - Joint Sealants.
- E. Exposed Fasteners: Manufacturer's standard self-drilling or self-tapping screws, type to suit application; with soft neoprene or EPDM washers, corrosion resistant coated or plated carbon steel. Fastener cap same color as panel.
- F. Pop Rivets: Manufacturer's standard stainless steel pop rivets, same finish as panel system.
- G. Field Touch-up Paint: As recommended by panel manufacturer.
- H. Bituminous Paint: Asphalt base.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that building framing members are ready to receive panels.
- B. Examine panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
 - 1. Inspect framing that will support wall panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of wall panels.
 - 2. Panel Support Tolerances: Confirm that wall panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:
 - a. 1/4 inch in 20 feet in any direction.

- b. 3/8 inch over any single wall plane.
 - c. Girt spacing 8 feet or more: 1/4 inch out only.
 - d. Girt spacing less than 8 feet: 1/8 inch out only.
 - e. Girt spacing less than 4 feet: 1/16 inch out only.
- C. Do not proceed with wall panel work until unsatisfactory conditions have been corrected in a manner acceptable to Architect, installer and manufacturer.

3.2 PANEL INSTALLATION

- A. Install panels in accordance with manufacturer's instructions.
- B. Attach panels to metal framing using screws, fasteners, sealants, and adhesives recommended for application by metal panel manufacturer.
- C. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer
- D. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint; allow to dry prior to wall panel installation.
- E. Fasten panels to structural supports; aligned, level, and plumb.
- F. Locate joints over supports.
- G. Lap liner panel sides one full corrugation.
- H. Lap panel ends 2 inches, minimum.
- I. Joint Sealers: Install sealants where indicated and where required for weatherproof performance of metal panel assemblies.
 - 1. Seal panel base assembly, openings, panel head joints, and perimeter joints in accordance with manufacturer's instructions.
- J. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.
- K. Cut panels in field where required using manufacturer's recommended methods; do not use friction plates to cut panels and other metal components.

3.3 ACCESSORY INSTALLATION

- A. Install wall panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
 - 2. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

3.4 TOLERANCES

- A. Offset From True Alignment Between Adjacent Members Abutting or In Line: 1/16 inch, maximum.
- B. Variation from Plane or Location As Indicated on Drawings: 1/4 inch, maximum.

3.5 CLEANING

- A. Remove site cuttings from finish surfaces.
- B. Remove protective material from wall panel surfaces.
- C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

3.6 PROTECTION

- A. Protect wall panels until completion of project.
- B. Touch-up, repair, or replace damaged wall panels or accessories before Date of Substantial Completion.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, and other items indicated.
- B. Sheet metal and flashings not specifically described but required to prevent penetration of water through exterior building shell.

1.2 DEFINITIONS

- A. Substantial completion of sheet metal flashing work is defined as the contractually required and weathertight installation of roof system including specified roof preparation, insulation, roof panels, flashings, counterflashings, sheet metal, fasteners, and sealants.

1.3 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- D. CDA A4050 - Copper in Architecture - Handbook; current edition.
- E. FM DS 1-28 - Wind Design; 2016.
- F. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.
- G. SPRI ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems; 2011.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of Section 07 4113 - Metal Roof Panel for installing fascias.
- B. Preinstallation Meeting: Convene one week before starting work of this section.
- C. Sequencing:
 - 1. Provide sheet metal and flashings not specifically described but required to prevent penetration of water through exterior building shell.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's technical product data, installation instructions, and general recommendations for each specified material and fabricated product.
- C. Shop Drawings: Indicate material profile, metal gages, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.6 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Edge Metal, Flashings, and Securement: Provide in accordance with SPRI ES-1.
- C. Provide products complying with the following design wind pressures:
 - 1. Factory Mutual Classification: Class I and windstorm resistance of I-90, in accordance with FM DS 1-28.
- D. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of documented experience.
- E. Provide products complying with roofing manufacturer's warranty requirements for leaks and wind resistance.

1.7 MOCK-UP

- A. See Section 01 4000 - Quality Requirements for additional requirements.
- B. Construct mock-ups of the following sheet metal flashing and trim:
 - 1. Sheet metal flashings beneath sills and copings included in mock-ups specified in Section 03 4500 - Precast Architectural Concrete.
- C. Mock-ups may remain as part of the Work.
- D. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24-gauge, 0.0239-inch thick base metal.
- B. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 26 gage (0/019 inch) thick; smooth mill finish.
- C. Prefinished metal flashings and trim at metal wall panel assemblies: As specified in Section 07 4213 – Metal Wall Panels.

2.2 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet, minimum 1 inches wide, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seal corners.

- E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Replacement Flashings: Fabricate flashings to match existing profiles.

2.3 EXTERIOR PENETRATION FLASHING PANELS

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.4 ACCESSORIES

- A. Fasteners:
 - 1. Exposed Fasteners at Masonry and Concrete Substrates: Self-tapping, stainless steel with hex heads.
 - 2. Pop Rivets: Stainless steel, size to support applied loading.
- B. Primer: Zinc chromate type.
- C. Wood Blocking and Nailers: Refer to Section 06 1000 - Rough Carpentry.
- D. Rain Collars: Pre-formed, one piece galvanized steel sheet metal fabrication with vertical flange and skirt; with channel for sealant application on top, and 1 inch lapped seam; fastened to pipe with two stainless steel clamping rings.
 - 1. Diameter: As required to match pipe diameter.
- E. Sealant: Types as specified in Section 07 9200 - Joint Sealants.
- F. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify wood nailers are in place and secure.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.
- D. Examine the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install components true to lines and levels.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.

- D. Provide protection of roofing surfaces from metal trimmings, foot traffic, and mechanical damage during flashing and sheet metal work.

3.3 INSTALLATION

- A. Comply with drawing details.
- B. Install sheet metal assemblies as required to meet roof manufacturer's requirements and to prevent penetration of water through exterior building shell, whether specifically described or not.
- C. Prime joints and surfaces receiving sealant in accordance with manufacturer's requirements.
- D. Lap seams in the direction of the water flow; provide 3 inch minimum lap at seams that do not have a joint cover.
- E. Secure components in place as recommended by manufacturer.
- F. Fasten clips and cleats 6 inches on center unless otherwise noted or unless other spacing is required by manufacturer.
- G. Apply plastic cement compound between metal flashings and felt flashings.
- H. Fit components tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- I. Rain Collars: Position around piping as indicated; provide continuous bead of concealed sealant at lapped seam and between vertical flange and pipe. Fasten seam together with two self-drilling stainless steel screws with EPDM washers. Secure flange to pipe with clamping rings. Seal exposed seam and fill sealant channel with sealant.
- J. Seal metal joints watertight.
 - 1. Sealant at concealed and exposed joints: As specified in Section 07 9200 - Joint Sealants.

3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.
- B. Remove unused sheet metal fasteners, scraps, and other debris resulting from sheet metal work that could puncture or damage roofing components.
- C. Provide final protection and maintain conditions that ensure sheet metal work during construction is without damage or deterioration other than natural weathering.
- D. Protect installed metal surfaces from subsequent construction operations.

3.5 SCHEDULE

END OF SECTION

SECTION 07 7123
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gutters.
- B. Downspouts.
- C. Downspout boots.

1.2 REFERENCE STANDARDS

- A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2022a.
- B. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate gutters and downspouts work with metal building specified in Section 13 3419.
 - 2. Coordinate gutters and downspouts work with metal roof panels work specified in Section 07 4113.
 - 3. Coordinate gutters and downspouts work with metal roof panels work specified in Section 07 4213.19.
 - 4. Coordinate downspout boot work with storm sewer piping work.
- B. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.
- C. Comply with applicable code for size and method of rain water discharge.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on prefabricated components.
 - 1. Product Data: Provide data on prefabricated components including, but not limited to, materials, finishes, downspout boots, and downspout strainers.
- C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
 - 1. Also include the following:
 - a. Gutter interface with flashings and edge metal details.
 - b. Gutter expansion joint details.
 - c. Downspout to gutter details.
 - d. Downspout and downspout support details.

- e. Downspout boots.
- f. Downspout discharge into downspout boots.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Aluminum-zinc alloy-coated SS (structural steel) sheet complying with ASTM A792/A792M; minimum AZ50 coating.
 - 1. Gutter and Downspout Thickness: 0.030 inch, minimum.
- B. Protective Backing Paint: Zinc molybdate alkyd.

2.2 COMPONENTS

- A. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance.
- B. Sizes: As indicated.
 - 1. Accessories: Profiled to suit gutters and downspouts.
- C. Gutters: Match gable trim rectangular style profile.
 - 1. Gutter to Downspout Connections: Flanged outlet connection in accordance with SMACNA (ASMM) Figure 1-33 Downspout - Gutter Connections, Detail 1.
 - a. Flange outlet to gutter fasteners: Rivets.
 - b. Flange outlet to downspout fastener: Rivets.
 - 2. Finish and Color: Fabricate of same finish and color as metal roof panels specified in Section 07 4113 - Metal Roof Panels.
- D. Downspouts: SMACNA plain square profile pre-fabricated from minimum 10 foot lengths, with concealed vertical seams.
 - 1. Finish and Color: Match gutter finish and color.
- E. Anchors and Supports: Profiled to suit gutters and downspouts.
 - 1. Anchoring Devices: Type recommended by fabricator.
 - 2. Gutter Supports: Straps.
 - a. Spacing: Match spacing of standing seams in metal roof panels.
 - 3. Downspout Supports: Brackets; Profile to suit downspouts.
 - a. Provide brackets in accordance with SMACNA (ASMM) Figure 1-35A.
 - 1) Size: 1/8 by 1 inch, minimum.
 - 2) Spacing: 10 feet on center (maximum).
 - b. Bracket fasteners at downspouts: Stainless steel rivets.
 - c. Bracket fasteners at framed walls: Self-drilling screws.
 - d. Fabricate brackets of same material and finish as downspout metal, color to match downspout color.
- F. Gutter Expansion Joint:

1. Provide Lap Type Gutter Expansion Joint in accordance with SMACNA (ASMM) Figure 1-6 Lap Type Gutter Expansion Joint.
 - a. Spacing: 40 feet, maximum.

G. Fasteners: Stainless steel.

2.3 FABRICATION

- A. Form gutters and downspouts of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.4 DOWNSPOUT BOOTS

- A. Basis of Design - Downspout Boots: Model# B1DT, as specified herein and manufactured by Piedmont Pipe Manufacturing: www.piedmontpipe.com.
 1. Color: Anodized Silver SRMS 95339.
- B. Downspout Boots: Smooth interior without boxed corners or choke points; include self-cleaning debris trap and concealed mounting hole.
 1. Configuration: 90 degree.
 2. Material: Stainless steel, ASTM A240/A240M, factory welded assembly from 12 gage (0.1094 inch) thick tube and plates.
 3. Inlet inside pipe dimensions: Match downspout pipe dimensions.
 4. Discharge inside pipe diameter: Refer to Drawings.
 5. Height: 60 inches.
 6. Locations: Provide at each downspout.
 7. Internal Sweep: 12 gage (0.1094 inch), ASTM A240/A240M, Type 304 stainless steel, electronically fused internal sweep elbow to ensure a smooth transition of flow.
 8. Debris Trap: Self-cleaning, 12 gage (0.1094 inch) thick, ASTM A240/A240M, Type 304 stainless steel, hinged and balanced to allow debris to be evacuated by the flow of water with removable stainless steel debris screen.
 9. Finish: Manufacturer's standard factory applied powder coat finish.
 10. Accessories: Manufacturer's standard tamper-resistant stainless steel fasteners, stainless steel building wall anchors, gaskets, and couplings.
- C. Substitutions: See Section 01 6000 - Product Requirements.

2.5 ACCESSORIES

- A. Downspout Strainers: Stainless steel, heavy-duty, globe shaped; designed to fit firmly in oval, round and square outlets without tools or fasteners.
 1. Wire thickness: 0.1 inch.
 2. Product: 5" Stainless Steel Heavy Duty Downspout Wire Strainer, KM Sheet Metal and Gutter Supply: www.kmsheetmetal.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Verify locations where downspouts connect to downspout boots.

3.2 INSTALLATION

- A. Install gutters and downspouts in accordance with manufacturer's instructions and approved shop drawings.
- B. Rigidly support and secure components.
- C. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- D. Connect gutters to downspouts with seams flashed and sealed watertight.
- E. Anchor downspout boots to walls plumb, in accordance with manufacturer's recommendations.
 - 1. Install downspout pipe boots with top of boots at uniform elevation.
 - 2. Connect downspouts to downspouts boots with watertight joints in accordance with manufacturer's recommendations.
 - 3. Connect downspout boots to storm sewer system. Seal connections watertight.
- F. Locations: Install downspout strainers in gutter at each gutter outlet.

3.3 TOLERANCES

- A. Downspout Maximum Variation From Plumb: 1/8 inch in 10 feet.
- B. Gutter Variation From Slope: 1/16 inch in 10 feet.

3.4 ADJUSTING

- A. Adjust debris traps on downspout boots for smooth, operation.
- B. Adjust gutters and downspouts as required to provide free-flowing gutters without standing water.

3.5 CLEANING AND PROTECTION

- A. Remove debris from gutters and downspouts.
- B. Remove unused fasteners, scraps, and other debris that could puncture or damage roofing, gutter, and downspout components.
- C. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

3.6 CLOSEOUT ACTIVITIES

- A. See Section 01 7900 - Demonstration and Training for additional requirements.
- B. Demonstrate proper operation of debris traps on downspout boots to Owner's designated representative.

3.7 PROTECTION

- A. Provide final protection and maintain conditions that ensure gutter and downspout work during construction is without damage or deterioration other than natural weathering.

B. Protect installed metal surfaces from subsequent construction operations.

END OF SECTION

SECTION 07 7200
ROOF ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe flashing (pipe boots) at metal roofs.
- B. Thimbles.

1.2 REFERENCE STANDARDS

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Pipe flashings: Identify materials, colors, sealant, and fasteners.
- C. Manufacturer's Installation Instructions: Indicate special procedures.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.1 THIMBLES

- A. Provide code-compliant, internally insulated, triple-wall construction, vented stainless steel sleeves recommended by manufacturer to prevent heat from piping from being transmitted to combustible materials at piping penetrations through roofs.
 - 1. Accessories: Provide connectors, flanges, gaskets, adapters, rodent screening and other accessories as recommended by manufacturer, including flashing and other components as required to provide leak-proof assembly.
 - 2. Thimble size: As recommended by manufacturer for roof construction, and temperature range and pipe diameter.
 - 3. Manufacturers:
 - a. DME Incorporated: www.dmeexpansionjoints.com.
 - b. Harco Manufacturing Company, Inc: www.harcomanufacturing.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PIPE FLASHING

- A. Applications: Pipe flashings at sheet metal roofs.
- B. Pipe Flashing Manufacturers:
 - 1. Dimensional Metals, Inc: www.dmimetals.com.

2. ITW Buildex: www.itwbuildex.com.
 3. Oatey Co: www.oatey.com.
 4. Substitutions: Not permitted.
- C. Pipe Flashing: Prefabricated flexible pipe flashing system with flexible aluminum base that conforms to metal roof panel configuration; one-piece construction with pleated cone that adjusts to any roof pitch; resistant to ozone and ultra-violet light; provide in sizes as required by manufacturer for piping penetrations; provide at conduit and piping penetrations of metal roof panels.
1. Color: Grey.
 2. Product: Dektite Black EPDM Ezi-Seal, ITW Buildex; www.itwbuildex.com.
- D. Exposed Fasteners: Stainless steel, self-tapping screws with hex heads and EPDM washers as recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify pipe flashing will not be in contact with seams of standing seam metal roofs; do not begin installation until penetrations that will result in contact with seams have been relocated to avoid contact with seams.
- B. Do not begin installation until substrates have been properly prepared.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Determine locations, types, and quantities of pipe supports are available to support piping and conduits as work progresses.
- C. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.
- B. Coordinate installation of components of this section with installation of plumbing piping components to ensure water tightness.

3.4 CLEANING

- A. Clean installed work to like-new condition.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- B. ASTM C834 - Standard Specification for Latex Sealants; 2017.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- E. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.
- F. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2018.
- G. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015, with Editorial Revision (2017).
- H. NSF 61 - Drinking Water System Components - Health Effects; 2020.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Certification by manufacturer indicating that product complies with specification requirements.
 - 7. Sealant Type Identification: Identify manufacturer's products according to the same Sealant Types (i.e., Type NS-AES-1, NS-SIL-1, etc.) listed in Part 2 of this Section.
 - a. Failure to identify products according to Sealant Types listed in Part 2 of this Section will result in immediate rejection of the submittal.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheets for each product to be used, including physical characteristics, installation instructions, and recommended tools.
 - 1. Include product data for manufacturer's primers that will be used with sealants specified; identify substrates where primers will be required.

- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Installer's qualification statement.
- F. Executed warranty.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this Section and with at least five years of documented experience.

1.5 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.6 COORDINATION

- A. Coordinate the work with all sections referencing this Section.
- B. Do not apply concrete sealers until full sealant cure period recommended by manufacturers is attained.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Warranty: Include coverage for installed sealants and accessories which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.
 - 1. Provide the following warranties for specific types of sealants indicated:
 - a. Building urethane sealants: 5 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 - 1. ADCO Products, Inc: www.adcoglobal.com.
 - 2. Franklin International, Inc: www.titebond.com.
 - 3. Master Builders Solutions by BASF: www.master-builders-solutions.basf.us/en-us/#sle.
 - 4. Pecora Corporation: www.pecora.com.
 - 5. Sika Corporation: www.usa-sika.com.
 - 6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
 - 7. Substitutions: Not permitted.

2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior and Interior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Joints to be sealed include, but are not limited to, joints identified in Schedule at end of this Section.

2.3 JOINT SEALANTS - GENERAL

- A. Colors: As indicated in Schedule at the end of this section.

2.4 NONSAG JOINT SEALANTS

2.5 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
 - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
 - 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
 - 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete floor joints that will be exposed in completed work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

3.3 INSTALLATION

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.

- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.4 POST-OCCUPANCY

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

3.5 SCHEDULE

- A. Provide Sealant Type NS-AES-1 at the following locations:
 - 1. Interior:
 - a. Joints between metal frames and gypsum board partitions.
 - b. Joints at penetrations in gypsum board.
 - c. Joints between countertops and adjacent field-painted surfaces.
 - d. Joints between fire extinguisher cabinets and field-painted surfaces of adjacent work.
 - 2. Colors:
 - a. Joints between metal frames and walls: Match wall color.
 - b. Other Locations: Standard colors matching adjacent finished surfaces.
- B. Provide Sealant Type NS-BUT-1 at the following exterior locations:
 - 1. Joints under tracks of exterior metal wall studs.
 - 2. Concealed sheet metal joints.
 - 3. Color: Grey.
- C. Provide Sealant Type NS-PE-1 at the following locations:
 - 1. Exterior:
 - a. Expansion joints in concrete slabs and pavements where slope of joints are equal to or greater than 1:100.
 - b. Expansion joints between buildings and concrete pavements or slabs where slope of joints are equal to or greater than 1:100.
 - c. Expansion joints between downspout boots and concrete paving where slope of joints are equal to or greater than 1:100.
 - 2. Color: Joints in grey cast-in-place concrete slabs and pavements: Limestone.
- D. Provide Sealant Type NS-PS-1 at the following locations:
 - 1. Interior and Exterior:
 - a. Expansion joints in concrete slabs and structures where slope of joints are equal to or greater than 1:100.
 - b. Expansion joints between walls and concrete slabs and structures where joints are sloped equal to or greater than 1:100.
 - c. Joints at penetrations in concrete slabs and structures where joints are sloped equal to or greater than 1:100.

2. Colors:
 - a. Joints in grey cast-in-place concrete structures, slabs, and pavements: Bronze.
- E. Provide Sealant Type NS-HY-1 at the following locations:
 1. Exterior:
 - a. Joints in sheet metal roofing components.
 - b. Joints in sheet metal wall panel components.
 - c. Exposed joints in sheet metal flashings and counterflashings.
 - d. Joints in sheet metal gutters and downspouts.
 - e. Joints between pipe flashing base and metal roof panels.
 - f. Joints between top of pipe flashing material and piping.
 - g. Joints between door frames and metal wall panels.
 - h. Joints between piping and walls.
 - i. Joints between conduits and walls.
 - j. Joints between ductwork and walls.
 - k. Joints between metal frames and adjacent work.
 - l. Joints between exposed metal and adjacent work.
 - m. Slabs under exterior door thresholds.
 - n. Joint between ends of threshold and door frames.
 - o. Exterior joints for which no other sealant type is indicated.
 2. Interior:
 - a. Joints at penetrations in metal wall panels.
 - b. Joints at penetrations in metal roof panels.
 - c. Interior joints for which no other sealant type is indicated.
 3. Colors:
 - a. Sealant at thresholds: Clear.
 - b. Sealant at perimeter of exterior metal frames: Match finish color of material adjacent to frames.
 - c. Other locations: Standard colors matching adjacent finished surfaces.

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Thermally insulated hollow metal doors with frames.

1.2 ABBREVIATIONS AND ACRONYMS

- A. ANSI: American National Standards Institute.
- B. HMMA: Hollow Metal Manufacturers Association.
- C. NAAMM: National Association of Architectural Metal Manufacturers.
- D. SDI: Steel Door Institute.
- E. UL: Underwriters Laboratories.

1.3 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI A250.6 - Hardware on Standard Steel Doors (Reinforcement--Application).; 2003 (R2009).
- C. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames.; 2003.
- D. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- E. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
- F. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- G. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- I. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2020.
- J. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- K. ASTM C1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus; 2019.
- L. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.

- M. FM (AG) - FM Approval Guide; current edition.
- N. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- O. ITS (DIR) - Directory of Listed Products; current edition.
- P. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- Q. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- R. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.
- S. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- T. SDI 111 - Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components; 2009.
- U. UL (DIR) - Online Certifications Directory; Current Edition.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Submittal Conference: Conduct coordination conference with attendance by representatives of the following:
 - 1. Conduct coordination conference with attendance by the following to review proper methods and the procedures for receiving, handling, and installing door hardware:
 - a. Contractor.
 - b. Owner.
 - c. Hardware Supplier.
 - d. Installer.
 - 2. Review sequence of operation narratives for each unique access controlled opening.
 - 3. Review and finalize construction schedule and verify availability of materials.
 - 4. Review the required inspecting, testing, commissioning, and demonstration procedures.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Door, frame, and hardware schedule in accordance with SDI 111.
- E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- G. Installer's Qualification Statement.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Curries, an Assa Abloy Group company: www.assaabloydss.com.
 - 3. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - 4. Steelcraft, an Allegion brand: www.allegion.com/us.
 - 5. Substitutions: Not permitted.

2.2 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for utility requirements.
- B. Products Requiring Electrical Connection: Listed and classified by FM (AG), ITS (DIR), UL (DIR), or testing agency acceptable to local authorities having jurisdiction as suitable for the purpose specified and indicated.

2.3 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Top and Bottom Closures: Continuous 16 gage steel channels, fully welded to face sheets.
 - a. Orientation: Flush top channel, inverted bottom channel.
 - 4. Door Edges: Continuous seam welded and ground smooth.
 - 5. Door Edge Profile: Hinged edge square, and lock edge beveled.
 - 6. Typical Door Face Sheets: Flush.
 - 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
 - 8. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
 - a. Hardware Reinforcements: Fabricate according to ANSI A250.6 with reinforcing plates from same material as door face sheets.
 - b. Lock Reinforcement: Manufacturer's standard for hardware sets specified in Section 08 7100 - Door Hardware.
 - c. Closer Reinforcement: 14 gage channel.
 - d. Continuous Hinge Reinforcement: Provide continuous welded 12 gage steel straps.

- e. Mortise Butt Hinge Reinforcement: Steel plate, 7 gage (3/16 inch) by 1-1/4 by 9 inches, minimum; or 14 gage continuous channel with pierced holes, drilled and tapped.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.4 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated.
 - 1. Grade: ANSI A250.8 (SDI-100); Level 2 - Heavy-Duty, Physical Performance Level B, Model 2- Seamless with fully-welded edges.
 - a. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 2. Door Core Material: Vertical steel stiffeners with foamed-in place polyurethane insulation.
 - 3. Door Thickness: 1-3/4 inches, nominal.
 - 4. Door Thermal Performance: U-value of 0.36, when tested in accordance with ASTM C1363.
 - 5. Product: 777E (Trio-E)/Polyurethane, with flush top and inverted bottom channel, Curries Company.
- C. Interior Doors, Non-Fire Rated:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Top and Bottom Closures: Fully welded, 16 gage, inverted channels.
 - e. Door Edges: Continuous seam welded and ground smooth.
 - f. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
 - 2. Door Core Material: Vertical steel stiffeners with fiberglass insulation.
 - 3. Door Thickness: 1-3/8 inches, nominal.
 - 4. Product: 747T Series with flush top and inverted channel bottom, Curries Company.

2.5 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Same as hollow metal door.
- C. Exterior Frames: Fully welded.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 - 2. Frame Metal Thickness: 12 gage, 0.093 inch, minimum.
- D. Interior Door Frames : Fully welded type.
 - 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- E. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations

- F. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations
- G. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.6 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.7 ACCESSORIES

- A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
 - 1. Provide silencers by frame manufacturer regardless if specified in Section 08 7100.
 - 2. Silencers are not required on weatherstripped or gasketed doors.
- B. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.
- C. Jamb Anchors:
 - 1. Provide frame anchors of type and at locations recommended by manufacturer for frame size and substrate material.
 - 2. Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on center and as follows:
 - a. Two anchors per jamb up to 60 inches high.
 - b. Three anchors per jamb from 60 to 90 inches high.
 - c. Four anchors per jamb from 90 to 120 inches high.
 - d. Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
- D. Floor Anchors: Provide floor anchors at each jamb, formed from A60 galvanized material, not less than 0.042 inches thick; weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.2 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

- B. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- C. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- D. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

3.3 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
- D. Install door hardware as specified in Section 08 7100.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- E. Silencers: Set flanges of silencers in light bed of adhesive prior to installation.

3.4 TOLERANCES

- A. Non-Fire-Rated Standard Steel Doors:
 - 1. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - 2. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - 3. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - 4. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.5 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.6 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 3100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall- and ceiling-mounted access units.

1.2 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Project Record Documents: Record actual locations of each access unit.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

PART 2 PRODUCTS

2.1 ACCESS DOORS AND PANELS ASSEMBLIES

- A. Locations: Provide at valves, dampers, thermostats, sensors, switches, and other equipment requiring access or adjustment; and other locations as indicated.
 - 1. Doors for general observation in ceilings: Locations indicated are diagrammatic; relocate doors to avoid ductwork, piping, structure, and other obstructions that conflict with observation access above openings.
- B. Wall-Mounted Units:
 - 1. Panel Material: Steel, hot-dipped zinc or zinc-aluminum-alloy coated.
 - 2. Size: 12 by 12 inch, unless otherwise indicated; or provide larger sizes as required to provide adequate access to valves, dampers, thermostats, sensors, switches, and other equipment requiring access or adjustment.
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 4. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.
- C. Walls in Wet Areas:
 - 1. Panel Material: Stainless steel.
 - 2. Size: 12 by 12 inch, unless otherwise indicated; or provide larger sizes as required to provide adequate access to valves, dampers, thermostats, sensors, switches, and other equipment requiring access or adjustment.
 - 3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
 - 4. Wall Mounting Criteria: Provide surface-mounted face frame and door surface flush with frame surface.

D. Ceiling-Mounted Units:

1. Panel Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
2. Size: 24 x 24 inches, unless otherwise indicated; or provide larger sizes as required to provide general observation and adequate access to valves, dampers, thermostats, sensors, switches, and other equipment requiring access or adjustment.
3. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

E. Ceilings in Wet Areas:

1. Material: Stainless steel.
2. Size: 24 x 24 inches, unless otherwise indicated; or provide larger sizes as required to provide adequate access to valves, dampers, thermostats, sensors, switches, and other equipment requiring access or adjustment.
3. Standard duty, hinged door.
4. Tool-operated spring or cam lock; no handle.

F. Basis of Design Products: Refer to Schedule at the end of this Section.

2.2 WALL- AND CEILING-MOUNTED ACCESS UNITS

A. Manufacturers:

1. Activar Construction Products Group - JL Industries: www.activarcpg.com/#sle.
2. ACUDOR Products Inc: www.acudor.com/#sle.
3. Babcock-Davis: www.babcockdavis.com/#sle.
4. Bilco Co.: www.bilco.com.
5. Cendrex, Inc: www.cendrex.com/#sle.
6. Karp Associates, Inc: www.karpinc.com.
7. Larsens Manufacturing Company: www.larsensmfg.com.
8. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.
9. Nystrom, Inc: www.nystrom.com/#sle.
10. O'Keeffe's Inc; www.okeeffes.com
11. Studco Building Systems: www.studcosystems.com/#sle.
12. Williams Brothers Corporation of America: www.wbdoors.com.
13. Substitutions: Not permitted.

B. Wall and Ceiling Mounted Units, Non-Fire Rated: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.

1. Door Style: Single thickness with rolled or turned in edges.
2. Frames: 16 gage, 0.0598 inch, minimum.
3. Single Thickness Steel Door Panels: 16 gage, 0.0598 inch, minimum.
4. Primed and Factory Finish: Polyester powder coat; color as selected by Architect from manufacturer's standard colors; not required on stainless steel units.

C. Hardware:

1. Hinges for Non-Fire-Rated Units: Continuous piano hinge.
2. Latch/Lock: Allen head cam latch.
3. Inside Latch Release: Mechanism that allows door/panel to be opened from inside.
4. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that rough openings are correctly sized and located.
- B. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to proceeding with this work.
- B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.3 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings, and secure units rigidly in place.
- C. Position units to provide convenient access to concealed equipment when necessary.
- D. Paint access doors and frames in accordance with Section 09 9000.

3.4 SCHEDULE

- A. Provide access doors where indicated and at valves, dampers, thermostats, sensors, switches, and other equipment requiring access or adjustment that will be concealed after walls and ceilings are finished; and at locations required by authorities having jurisdiction.
- B. Non-Fire Rated Door and Frame Units in Walls and Ceilings:
 - 1. Product: Model TM, J.L. Industries, Inc.
- C. Non-Fire Rated Door and Frame Units in Wet Areas:
 - 1. Product: Model TMS, J.L. Industries, Inc.

END OF SECTION

SECTION 08 3323
OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior coiling doors.
- B. Wiring from electric circuit disconnect to operators and control stations.

1.2 REFERENCE STANDARDS

- A. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- C. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- D. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction and component connections and details.
 - 1. Provide independent testing lab results demonstrating compliance with air infiltration requirements identified in Regulatory Requirements article included in this Section.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Samples: Submit two samples 2 x 2 inch in size illustrating shape, color and finish texture.
- E. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
- F. Installer qualification statement: Provide in accordance with the "Quality Assurance" article; submit installer's experience with same products and manufacturer's verification that installer is authorized to install products specified.
- G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- H. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.
- I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section, with minimum ten years' experience and authorized by the overhead coiling door manufacturer as an approved installer for each overhead door system included in this section for at least five years from the Bid Date of this project.

1.5 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.

1.6 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer Warranty: Provide two year manufacturer's warranty against defects in workmanship and materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design for Event Facility - Exterior Overhead Coiling Doors: Overhead Rolling Steel Service Door, Model 625 with Air Infiltration package, as specified herein and manufactured by Overhead Door Corporation: www.overheaddoor.com.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.2 COILING DOORS

- A. Exterior Coiling Doors: Galvanized steel slat curtain.
 - 1. Capable of withstanding positive wind loads of 20 psf, without undue deflection or damage to components.
 - 2. Provide doors capable of withstanding Standard construction for normal use of up to 20 cycles per day maximum, and a life cycle expectancy of up to 50,000.
 - 3. Provide exterior overhead coiling door assemblies with an air infiltration rate compliant with the following as validated by an independent testing agency:
 - a. ASHRAE Std 90.1 I-P of less than 0.3 cfm/ft², as tested per ASTM E283, validated by an independent testing agency.
 - b. Air Infiltration Certification Label: Provide affixed to bottom bar.
- B. Sandwich slat construction with insulated core of foamed-in-place polyurethane insulation; minimum R-value of 8.0.
 - 1. Nominal Slat Size: 3 inches wide by required length.
 - 2. Slat Thickness: 1 inch (nominal).
- C. Hood Enclosure: Manufacturer's standard; galvanized steel with internal baffle to prevent air infiltration.
- D. Manual hand chain lift operation.
 - 1. Mounting: Surface mounted.
 - 2. Watertight components.
 - 3. Chain Location: Interior side

4. Chain Components: Provide endless steel chain, cast iron geared reduction unit with maximum 30-lb pull for door operation, and chain holder secured to operator guide

2.3 MATERIALS AND COMPONENTS

- A. Metal Curtain Construction: Interlocking slats.
 1. Slat Ends (end locks): Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
 2. Windlocks: Manufacturer's standard, corrosion-resistant; provide as required to meet wind load requirements.
 3. Curtain Bottom (Bottom Bar): Reinforced extruded aluminum interior face with full depth insulation and exterior skin slat to match curtain material and gage.
 - a. Size: 4 inches high by 1-1/16 inch thick.
 4. Weatherstripping: Moisture and rot proof, resilient type, located at jamb edges, bottom of curtain, and where curtain enters hood enclosure of exterior doors.
 - a. Guides: Replaceable vinyl strip on guides sealing against both sides of curtain.
 - b. Lintel Seal: Double brush seal with EPDM sandwiched between the two brush seals at door header to impede air flow.
 - c. Hood: Neoprene/rayon baffle to impede air flow above coil.
 - d. Motor Operated Doors: Sensing/weather edge with neoprene astragal extending full width of door bottom bar.
- B. Steel Guides: Thermally broken, 3/16 inch steel angles with removable guide stoppers to prevent over travel of curtain and bottom bar; factory painted.
 1. Top of Coil Side Guide Angles: Removable for ease of curtain installation and as needed for future curtain service.
- C. Hood Enclosure and Trim: Internally reinforced to maintain rigidity and shape.
 1. Minimum 24 gage, galvanized.
 2. Factory Finish: Baked-on polyester finish coat.
 3. Color: Gray.
- D. Lock Hardware:
 1. Auxiliary Chain Lift: Provide manufacturer's standard, stored above coil near disconnect switch.
 2. Manual Chain Lift: Provide padlockable chain keeper on guide.
- E. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.
- F. Brackets: Steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures; factory finished.
- G. Trim Package: Manufacturer's 16 gage, custom-made trim to hide visible bolts, fasteners and other exposed hardware.
 1. Finish: Match finish on guides.

2.4 FINISHES

- A. Factory Finish: ASTM A653/A653M galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding, backed-on base coat and baked-on polyester finish coat.

1. Color: Gray.
- B. Provide factory finish on the following components:
 1. Slats (interior and exterior surfaces).
 2. Bottom Bar.
 3. Guides.
 4. Brackets.
 5. Hood.
- C. Factory Finish: PowerGuard polyester based powder coat:
 1. First Coat: Corrosion inhibiting primer, minimum 0.2 mils dry film thickness.
 2. Finish Coat: Polyester-based powder coating, heat cured, minimum 1.5 mils dry film thickness.
 - a. Color: Standard Exterior Color; White .

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that opening sizes, tolerances and conditions are acceptable.

3.2 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Complete wiring from disconnect to unit components.

3.3 TOLERANCES

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.
- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet straight edge.

3.4 ADJUSTING

- A. Adjust operating assemblies for smooth and noiseless operation.
- B. Modify door bottom and curtain construction to conform to irregular surfaces which project above the plane of the floor, as required to provide a tight seal.

3.5 CLEANING

- A. Clean installed components.
- B. Remove labels and visible markings.

3.6 SCHEDULE

A. Exterior Coiling Door Type A:

1. Location: Door 101 at Event Barn.
2. Size: As indicated on the Drawings.
3. Hood Enclosure: Manufacturer's standard curved profile; galvanized steel; internally reinforced to maintain rigidity and shape; with internal baffle to prevent air infiltration.
 - a. Finish: Minimum 24 gage, galvanized.

B. Exterior Coiling Door Type B:

1. Location: Door 207, 208, 209, 210, 211, 212 at Multi-Purpose Center Facility.
2. Size: As indicated on the Drawings.
3. Hood Enclosure: Manufacturer's special square profile; stainless steel; internally reinforced to maintain rigidity and shape; with internal baffle to prevent air infiltration.
 - a. Minimum 24 gage stainless steel, Type 304, #4 finish.

END OF SECTION

SECTION 08 4500
TRANSLUCENT WALL AND ROOF ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plastic glazed translucent wall system.

1.2 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
- C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2020.
- D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- E. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction; 2015.
- F. ICC-ES AC177 - Acceptance Criteria for Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems; 2014, with Editorial Revision (2018).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate translucent wall assemblies with installation of metal building secondary framing and metal wall panels.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, panel configuration, internal drainage details and finishes of components.
- C. Installer Certification: Submit installer certificate, signed by the installer, certifying compliance with project qualification requirements.
- D. Test Reports: Submit product test reports from an independent testing agency indicating each type and class of panel system complies with the project performance requirements based on comprehensive testing of the same products used on this project. Submit test reports for each criteria identified in Performance Requirements article in this Section, indicating results that include the following performance criteria:
 - 1. Beam Bending Strength.
 - 2. Panel Deflection.
- E. Test Reports: Submit substantiating engineering data and test reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products.
 - 1. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.

- F. Installer's Certificate: Signed by installer, certifying compliance with project qualification requirements.
- G. Warranty: Provide manufacturer's warranty that documents requirements listed in this specification.
 - 1. Sample Warranty: Provide example of manufacturer's warranty that documents requirements listed in this specification; Submit actual warranty in accordance with Section 01 7800 - Closeout Submittals.
 - 2. Provide documentation from manufacturer verifying that walking upon the panel(s) during installation, maintenance, or inspection, will not void the warranty of the product.

1.5 QUALITY ASSURANCE

- A. Panel System Components specified in this Section: Provide components fabricated from the same manufacturer.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than twenty years of documented experience manufacturing face sheets being provided on this project.
 - 1. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an accredited agency.
 - 2. Manufacturer's quality control inspections must be conducted at least once each year including manufacturing facilities, sandwich panel components, and production sandwich panels for conformance with ICC-ES AC177.
- C. Installer Qualifications: Company specializing in performing the work of this section with at least five years of documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Provide products and assemblies that comply with requirements of local governing authorities.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle work of this section in accordance with AAMA CW-10.
- B. Protect prefinished aluminum surfaces with wrapping; do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
 - 1. Puncture wrappings at ends for ventilation.
 - 2. Protect prefinished aluminum surfaces from damage.
- C. Store panels in accordance with manufacturer's storage and handling instructions.

1.8 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.

1.9 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 5-year manufacturer warranty against failure of insulated translucent sandwich panels, including excessive deflection, defects in accessories, and other components. Complete forms in Owner's name and register with manufacturer.

1.10 COORDINATION

- A. Coordinate the Work with installation of framing and roofing components.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design - Translucent Wall Panels:
 - 1. Western States Metal Roofing PBR Siding Panel Polycarbonate as specified herein and manufactured by Western States Metal Roofing, www.westernstatesmetalroofing.com.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.2 PERFORMANCE REQUIREMENTS

- A. Panel Deflection: No more than 1.9 inches at 30 PSF in 10 feet span without a supporting frame, when tested in accordance with ASTM E72.
- B. Beam Bending Strength: Panels shall deflect no more than 1.9 inches at 30 psf in 10 foot span without a supporting frame when tested in accordance with ASTM E72.
- C. Expansion/Contraction: System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components.

2.3 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209/B209M.
- C. Flashings: 0.040 inch thick aluminum, finish as selected, secured with concealed fastening method.
- D. Fasteners: Stainless steel.

2.4 COMPONENTS

- A. Support Framing Members: Extruded aluminum, size and profile as indicated and as required by manufacturer to meet design requirements.
- B. Clamp Channels and Mullions: Manufacturer's two-piece, extruded aluminum perimeter framing, sized to rigidly retain and weatherseal panels in place; secured with manufacturer's standard fastening method.
 - 1. Thermal Breaks: Refer to Schedule at the end of this Section.
- C. Sealant: Refer to Section 07 9200 - Joint Sealants.

2.5 FABRICATION

- A. Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, and ensure proper installation and dynamic movement of perimeter seals.
- B. Prepare components to receive anchor devices.
- C. Arrange fasteners and attachments to maximize concealment from view.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify wall openings and framing members are ready to receive work of this section.

3.2 SURFACE PREPARATION

- A. Where aluminum contacts dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

3.3 INSTALLATION

- A. Install translucent panel system with cells vertical in accordance with manufacturer instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.
- E. Set flanges of clamps and mullions in continuous bead of sealant.
- F. Seal perimeter of frames with sealant.

3.4 PROTECTION

- A. Protect finished work from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 5659
SERVICE AND TELLER WINDOW UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Service and teller window units.

1.2 RELATED REQUIREMENTS

- A. Section 07 2500 - Weather Barriers: Sealing frames to water-resistive barrier installed on adjacent construction.
- B. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

1.3 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate work with adjacent materials specified in other sections and as indicated on drawings and approved shop drawings.
- B. Coordinate electrical service and rough-in requirements.
- C. Preinstallation Meeting: Prior to start of installation arrange a meeting on site to familiarize installer and installers of related work with requirements relating to this work.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's product data for specified products indicating materials, operation, glazing, finishes, and installation instructions.
- C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver units in manufacturer's original packaging and unopened containers with identification labels intact.
- B. Store units in area protected from exposure to weather and vandalism.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Provide manufacturer's warranty agreeing to repair or replace units and their components that fail in materials or workmanship within two years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Service and Teller Window Units:

1. Quikserv; Self Closing Drive-Thru Slider Window: www.quikserv.com/#sle.
2. Substitutions: See Section 01 6000 - Product Requirements.

2.2 SERVICE AND TELLER WINDOW UNITS

A. Location: Built within exterior wall, as indicated on drawings.

B. Type of Use: Walk-up.

C. Window Type: Sliding, single horizontal.

1. Operation: Self-closing.
2. Mounting: Flush with wall surface.
3. Window Size: 36 inch wide by 36 inch high.
4. Size of Counter Space: Manufacturer's standard size.
5. Material: Aluminum.
 - a. Finish: Clear anodized.
6. Header: Manufacturer's standard type.
7. Sill: Manufacturer's standard type.

D. Glazing: Single (monolithic), clear.

1. Tempered safety glazing.

2.3 ASSEMBLY COMPONENTS

A. Windows: Factory-fabricated, finished, and glazed, with extruded aluminum frame and glazing stops; complete with hardware and anchors.

1. Provide window units that are re-glazable from the secure side without dismantling the non-secure side of framing.
2. Rigidly fit and secure joints and corners with internal reinforcement. Make joints and connections flush, hairline, and weatherproof. Fully weld corners.
3. Apply factory finish to exposed surfaces.
4. Wind Design: Design and size components to withstand dead loads and live loads caused by pressure and negative wind loads acting normal to plane of window as calculated in accordance with applicable code.
5. Self-Closing Operation: Manual open and self-closing with auto-locking handles and magnetic hold-open device.

2.4 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Class II Natural Anodized Finish: AAMA 611 AA-M12C22A31 Clear anodic coating not less than 0.4 mils thick.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install units in correct orientation (inside/outside or secure/non-secure).
- C. Anchor units securely in manner so as to achieve performance specified.

END OF SECTION

SECTION 08 7100
DOOR HARDWARE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hardware for wood, aluminum, and hollow metal doors.
- B. Thresholds.
- C. Weatherstripping and gasketing.

1.2 ABBREVIATIONS AND ACRONYMS

- A. General Abbreviations:
 - AHC: Architectural Hardware Consultant.
 - BHMA: Builders Hardware Manufacturers Association.
 - DHI: Door Hardware Institute.
- B. Manufacturer's Abbreviations: Refer to Part 3 in this Section.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. BHMA A156.1 - Standard for Butts and Hinges; 2021.
- C. BHMA A156.2 - Bored and Preamsembled Locks and Latches; 2022.
- D. BHMA A156.3 - Exit Devices; 2020.
- E. BHMA A156.4 - Door Closers and Pivots; 2024.
- F. BHMA A156.5 - Cylinders and Input Devices for Locks; 2020.
- G. BHMA A156.6 - Standard for Architectural Door Trim; 2021.
- H. BHMA A156.7 - Template Hinge Dimensions; 2016.
- I. BHMA A156.8 - Door Controls - Overhead Stops and Holders; 2021.
- J. BHMA A156.13 - Mortise Locks & Latches Series 1000; 2022.
- K. BHMA A156.16 - Standard for Auxiliary Hardware; 2023.
- L. BHMA A156.18 - Standard for Materials and Finishes; 2020.
- M. BHMA A156.21 - Thresholds; 2019.
- N. BHMA A156.22 - Standard for Gasketing; 2021.
- O. BHMA A156.28 - Standard for Recommended Practices for Mechanical Keying Systems; 2023.
- P. BHMA A156.36 - Auxiliary Locks; 2020.
- Q. BHMA A156.41 - American National Standard For Door Hardware Single Motion to Egress; 2020.
- R. BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- S. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.

- T. DHI (H&S) - Sequence and Format for the Hardware Schedule; 2019.
- U. DHI (KSN) - Keying Systems and Nomenclature; 2019.
- V. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- W. ICC A117.1-2009 - Accessible and Usable Buildings and Facilities; 2009.
- X. NFPA 110 - Standard for Emergency and Standby Power Systems; 2025.
- Y. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- Z. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- AA.UL (DIR) - Online Certifications Directory; Current Edition.
- BB. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- CC. UL 305 - Standard for Panic Hardware; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Submittal Sequence: Submit the Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Pre-Submittal Conference: Conduct coordination conference with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
- D. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Attendance is required by affected installers and the following:
 - a. Architect.
 - b. Installer's Architectural Hardware Consultant.
 - c. Hardware Installer.
- E. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- F. Keying Requirements Meeting:
 - 1. Schedule meeting at project site prior to submitting door hardware submittal.
 - 2. Attendance Required:
 - a. Contractor.
 - b. Owner.
 - c. Architect.
 - d. Hardware Installer.
 - e. Owner's Security Consultant.

3. Agenda:
 - a. Establish keying requirements.
 - b. Verify locksets and locking hardware are functionally correct for project requirements.
 - c. Verify that keying and programming complies with project requirements.
 - d. Verify pans for existing and future key system expansion.
 - e. Establish keying submittal schedule and update requirements.
 - f. Requirements for key control storage and software.
 - g. Installation of permanent keys, cylinder cores and software.
 - h. Address and requirements for delivery of keys.
 - i. Location of key cabinet.
 4. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
 - a. Access control requirements.
 - b. Key control system requirements.
 5. Record minutes and distribute copies within seven days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
 6. Deliver established keying requirements to manufacturers.
- G. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installer's personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.:
1. Review sequence of operation narratives for each unique access controlled opening.
 2. Review and finalize construction schedule and verify availability of materials.
 3. Review the required inspecting, testing, commissioning, and demonstration procedures.
- H. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
- C. Shop Drawings - Door Hardware Schedule: Prepared by or under the supervision of by or under supervision of an Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - a. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Hardware Schedule at the end of this Section. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - a. List groups and suffixes in proper sequence.
3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer and catalog number of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
- D. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
 1. Bitting List: List of combinations as furnished.
 2. Include maintenance data in closeout submittals. Refer to Section 01 7800 - Closeout Submittals.
- E. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
 1. Submit 1 electronic copy of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- F. Installer's qualification statement.
- G. Supplier's qualification statement.
- H. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 1. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

1.6 QUALITY ASSURANCE

- A. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- B. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.

- C. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) to assist in work of this section.
 - 1. Experience: Minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- D. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.
- B. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- C. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.
- D. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the Keying Requirements Meeting.

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.
 - 1. Closers: Ten years, minimum.
 - 2. Manual Overhead Door Closer Bodies: Twenty five years, minimum.
 - 3. Exit Devices: Five years, minimum.
 - 4. Mortise Locks and Latches: Ten years, minimum.
 - 5. Cylindrical (bored) Locks and Latches: Five years, minimum.
 - 6. Cylindrical Indicator Locksets: Three years, minimum.
 - 7. Other Hardware: Two years, minimum.

- D. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
1. Structural failures including excessive deflection, cracking, or breakage.
 2. Faulty operation of the hardware.
 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 4. Electrical component defects and failures within the systems operation.

PART 2 PRODUCTS

2.1 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
1. Applicable provisions of federal, state, and local codes.
 2. Accessibility: ADA Standards and ICC A117.1-2009.
 3. Auxiliary Hardware: BHMA A156.16.
 4. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
- D. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. Refer to Door Hardware Schedule.
- E. Fasteners:
1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
 - a. Aluminum fasteners are not permitted.
 - b. Provide Phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
 2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
 - a. Self-drilling (Tek) type screws are not permitted.
 3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
 4. Provide wall grip inserts for hollow wall construction.
 5. Provide spacers or sex bolts with sleeves for through bolting of hollow metal doors and frames.
 6. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
 7. Fire-Rated Applications: Comply with NFPA 80.
 - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
 - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.
 8. Concealed Fasteners: Do not use through or sex bolt type fasteners on door panel sides indicated as concealed fastener locations, unless otherwise indicated.

2.2 HINGES

A. Hinges: Comply with BHMA A156.1, Grade 1.

1. Basis of Design - Butt Hinges: McKinney TA/T4A Series, 5-knuckle as specified herein and manufactured by Assa Abloy: www.assaabloydss.com/#sle.
 - a. Other Acceptable Manufacturers:
 - 1) Hager Companies: www.hagerco.com/#sle.
 - 2) Ives, an Allegion brand: www.allegion.com/us/#sle.
 - 3) Stanley, dormakaba Group: www.stanleyhardwarefordoors.com/#sle.
2. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
 - a. Hinge Size: Provide the following hinge widths sized for door thickness and clearances required:
 - 1) Door widths up to 36 inches wide: 4-1/2 inches standard or heavy weight as specified.
 - 2) Door widths more than 36 inches wide to 48 inches wide: 5 inches standard or heavy weight as specified.
 - b. Hinge weight and base material: Unless otherwise indicated, provide the following:
 - 1) Exterior doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - 2) Interior doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
3. Provide hinges on every swinging door.
4. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
5. Provide non-removable pins on outswinging doors.
 - a. Exception: Doors with electric through wire hinges.
6. Provide following quantity of butt hinges for each door:
 - a. Doors up to 60 inches High: Two hinges.
 - b. Doors From 60 inches High up to 90 inches High: Three hinges.
 - c. Doors 90 inches High up to 120 inches High: Four hinges.
 - d. Doors over 120 inches High: One additional hinge per each additional 30 inches in height.

2.3 FLUSH BOLTS

A. Manufacturers:

1. Hager Companies: www.hagerco.com/#sle.
2. Ives, an Allegion brand: www.allegion.com/us/#sle.
3. Rockwood Products, an Assa Abloy Group company: www.assaabloydss.com/#sle.
4. Stanley, dormakaba Group: www.stanleyhardwarefordoors.com/#sle.
5. Trimco: www.trimcohardware.com/#sle.
6. Substitutions: Not permitted.

B. Flush Bolts and Surface Bolts: Comply with BHMA A156.3 and BHMA A156.16, Grade 1.

1. Provide flush bolts with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Flush Bolt Throw: 3/4 inch, minimum.
3. Provides extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.

- a. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
- 4. Provide dustproof floor strike for bolt into floor, except at metal thresholds.
- 5. Provide surface bolts 8 inches in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
- 6. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required by manufacturer for operation.

2.4 EXIT DEVICES

- A. Basis of Design - Exit Devices: 6000 Series as specified herein and manufactured by Accentra (formerly known as Yale); an Assa Abloy Group company: www.assaabloydss.com.
- B. Other Acceptable Manufacturers:
 - 1. Precision, dormakaba Group: www.precisionhardware.com/#sle.
 - 2. Von Duprin, an Allegion brand: www.allegion.com/us.
 - 3. Substitutions: Not permitted.
- C. Conventional Push Rail Exit Devices (Commercial Duty): Comply with BHMA A156.3, Grade 1.
 - 1. Lever design to match lockset trim.
 - a. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
 - 2. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Schedule at the end of this Section.
 - 3. Provide exit devices properly sized for door width and height.
 - 4. Provide strike as recommended by manufacturer for application indicated.
 - 5. Comply with UL 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet ICC A117.1.
 - 6. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL 305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Schedule at the end of this Section.
 - 7. Extended Cycle Test: Exit devices to have been cycle tested in ordinance with BHMA A156.3 requirements to 5 million cycles or greater.
 - 8. Exit Device Latchbolts: Cast stainless steel, Pullman type, with deadlock feature.
 - 9. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
 - 10. Provide exit devices with flush end caps made of architectural metal in the same finish as the devices as in the Hardware Schedule at the end of this Section. Plastic end caps will not be acceptable.
 - 11. Provide less bottom rod (LBR) at scheduled locations to eliminate use of floor mounted strikes.
 - 12. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 - a. Lock Trim Design: As indicated in Hardware Schedule at the end of this Section, provide finishes and designs to match that of the specified locksets.

- b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Schedule at the end of this Section.
- 13. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
- 14. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Schedule at the end of this Section, provide devices designed for maximum 2 inch wide stiles.
- 15. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
- 16. Rail Sizing: Provide exit device rails factory sized for proper door width application.
- 17. Through Bolt Installation: For exit devices and trim as indicated in Hardware Schedule at the end of this Section.

2.5 LOCK CYLINDERS

A. Manufacturers:

- 1. Accentra (formerly known as Yale); an Assa Abloy Group company: www.assaabloydss.com.
- 2. Best, dormakaba Group: www.bestaccess.com/#sle.
- 3. Schlage, an Allegion brand: www.allegion.com/us.
- 4. Substitutions: Not permitted.

B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.

- 1. Keyway: Match facility standard.
- 2. Provide small format interchangeable core (SFIC) type cylinders, Grade 1, with six-pin core in compliance with BHMA A156.5 at locations indicated.
- 3. Provide cylinders from same manufacturer as locking device.
- 4. Provide cams and/or tailpieces as required for locking devices.
- 5. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
 - a. Threaded mortise cylinders with rings and cams to suit hardware application.
 - b. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - c. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 - d. Tubular deadlocks and other auxiliary locks.
 - e. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - f. Keyway: Manufacturer's standard.
- 6. Equip locksets with cylinders keyed to existing lock system.

2.6 CYLINDRICAL LOCKS

A. Manufacturers:

- 1. Accentra (formerly known as Yale); an Assa Abloy Group company: www.assaabloydss.com.
- 2. Best, dormakaba Group: www.bestaccess.com/#sle.
- 3. Schlage, an Allegion brand: www.allegion.com/us.
- 4. Substitutions: Not permitted.

B. Cylindrical Indicator Locksets (Commercial Duty): BHMA A156.2, Grade 1 , 4000 Series.

1. Basis of Design - Cylindrical Indicator Locksets: YPL Series as specified herein and manufactured by Accentra (formerly known as Yale); an Assa Abloy Group company: www.assaabloydss.com.
 2. Provide locksets with functions and features as follows:
 - a. Visual status indicators in rose, displaying bold visuals for vacant or occupied lock status.
 - b. Meets BHMA A156.41 for single motion egress.
 - c. Meets UL 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet ICC A117.1.
 3. Keyway: Match facility standard.
- C. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 2, 4000 Series.
1. Basis of Design - Cylindrical Locks: 4600LN Series as specified herein and manufactured by Accentra (formerly known as Yale); an Assa Abloy Group company: www.assaabloydss.com.
 2. Provide locksets with functions and features as follows:
 - a. Locks: Non-handed and fully field reversible.
 - b. Keyway: Match facility standard.
 - c. Meets BHMA A156.41 for single motion egress.
 - d. Meets UL 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet ICC A117.1.
- D. Provide solid cast levers with brass or stainless steel latchbolts.
1. Bored Hole: 2-1/8 inch diameter.
 2. Latchbolt Throw: 1/2 inch, minimum.
 - a. Provide 3/4 inch throw at rated paired openings.
 3. Backset: 2-3/4 inch unless otherwise indicated.
 4. Provide locks with independent return springs that allow lock to exceed BHMA A156.2 Grade 1 cycle requirements without lever sag.
 5. Provide a lock for each door, unless otherwise indicated that lock is not required.
 6. Where required by authorities having jurisdiction, provide knurling or abrasive coating on all levers leading to hazardous areas.
 7. Provide an office lockset for swinging door where hardware set is not indicated.
 8. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.
- E. Substitutions: See Section 01 6000 - Product Requirements.

2.7 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
1. Finish: To match lock or latch.
 2. Flat-Lip Strikes: Provide for locks with three piece antifriction latchbolts as recommended by manufacturer.
 3. Extra-Long-Lip Strikes: Provide for locks used on frames with applied wood casing trim.
 4. Aluminum-Frame Strike Box: Provide strike box fabricated for use with aluminum framing by framing manufacturer.
 5. Rabbet Front and Strike: Provide on locksets for use with rabbeted meeting rails.
 6. Double-lipped strikes: For locks at double acting doors. Provide with retractable stop for rescue hardware applications.

7. Standards: Comply with the following:
 - a. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - b. Strikes for Bored Locks and Latches: BHMA A156.2.
 - c. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - d. Dustproof Strikes: BHMA A156.16.

2.8 DOOR PULLS AND PUSH PLATES

A. Manufacturers:

1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
2. Hager Companies: www.hagerco.com/#sle.
3. Ives, an Allegion brand: www.allegion.com/us/#sle.
4. Schlage, an Allegion brand: www.allegion.com/us.
5. Trimco: www.trimcohardware.com.
6. Substitutions: Not permitted.

B. Door Pulls and Push Plates: Comply with BHMA A156.6.

1. Pull Type: Straight, unless otherwise indicated.
 - a. Provide size, shape, and material as indicated in the Hardware Sets, not more than 2 inches less than door width (LDW) on stop side of single doors and not more than 1 inch LDW on pull side.
 - 1) Coordinate and provide proper width and height as required where conflicting hardware dictates.
 - b. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 inches from face of door and offset of 90 degrees unless otherwise indicated.
 - c. Pulls, where applicable, shall be provided with a 10 inch clearance from the finished floor on the push side to accommodate wheelchair accessibility.
2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
 - a. Edges: Beveled, unless otherwise indicated.
 - b. Material: Stainless steel, 300 grade, at least 0.050 inch thick.
3. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.
4. On solid doors, provide matching door pull and push plate on opposite faces.
5. On glazed storefront doors, provide matching door pulls/push plates on both faces unless otherwise indicated.
6. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Schedule at the end of this Section.

2.9 REMOVABLE MULLIONS

- A. Manufacturer: Same manufacturer as door lockset or door exit device.
- B. Steel Removable Mullions: BHMA A156.3 steel removable mullions with options for fire rating, locking, through-wire electrification and hurricane compliance as specified.
- C. Operation: Removable with single turn of key; Securely reinstalled without need for key.
 1. Key: Same bitting as door lockset or door exit device.
- D. Provide stabilizers and mounting brackets as required by manufacturer for project conditions.
- E. Provide storage brackets for securely stowing the mullion away from the door when removed.

2.10 CLOSERS

- A. Basis of Design - Closers: 2700 Series as specified herein and manufactured by Accentra (formerly known as Yale); an Assa Abloy Group company: www.assaabloydss.com.
 - 1. Other Acceptable Products:
 - a. DORMA USA, Inc; 8900 Series: www.dorma.com/#sle.
 - b. LCN, an Allegion brand; 4000 Series: www.allegion.com/us.
 - c. Norton Rixson; 210 Series: www.assaabloydss.com.
 - 2. Substitutions: Not permitted.
- B. General: Provide door closers from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
- C. Closers: Comply with BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.
- D. Type: As indicated in door hardware sets.
 - 1. Provide door closer on each exterior door.
 - 2. Comply with UL 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet ICC A117.1.
 - 3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use.
 - a. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ICC A117.1.
 - 4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Schedule.
 - 5. Provide rack and pinion type closers with one piece cast iron or aluminum alloy body construction and spring power adjustment sizes 1 thru 6, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.
 - 6. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.
 - 7. Mounting:
 - a. At corridor entry doors, mount closer on room side of door.
 - b. At outswinging exterior doors, mount closer on interior side of door.
 - c. At other locations install closers on door for optimum aesthetics.
 - 8. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the Hardware Schedule at the end of this Section.

2.11 PROTECTION PLATES

- A. Manufacturers:
 - 1. Burns Manufacturing, Inc: www.burnsmfg.com.
 - 2. Rockwood; an Assa Abloy Group company: www.assaabloydss.com.
 - 3. Hager Companies: www.hagerco.com/#sle.

4. Ives, an Allegion brand: www.allegion.com/us.
 5. Schlage, an Allegion brand: www.allegion.com/us.
 6. Trimco: www.trimcohardware.com.
 7. Substitutions: Not permitted.
- B. Protection Plates: Comply with BHMA A156.6.
1. Size: Fabricate protection plates (kick, armor, or mop) not more than 2 inches less than door width (LDW) on stop side of single doors and 1 inch LDW on stop side of pairs of doors, and not more than 1 inch less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Schedule at the end of this Section.
 2. Where plates are applied to fire rated doors with the top of the plate more than 16 inches above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications
- C. Metal Properties: Stainless steel.
1. Metal, Standard Duty: Thickness 0.050 inch, minimum.
- D. Edges: Square, on four sides unless otherwise indicated.
- E. Fasteners: Countersunk screw fasteners.

2.12 WALL STOPS

- A. Manufacturers:
1. Rockwood; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 2. Glynn-Johnson, an Allegion brand: www.allegion.com/us.
 3. Hager Companies: www.hagerco.com/#sle.
 4. Ives, an Allegion brand: www.allegion.com/us/#sle.
 5. Trimco: www.trimcohardware.com.
 6. Substitutions: Not permitted.
- B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
1. Provide wall stops to prevent damage to wall surface upon opening door.
 2. Type: Bumper, convex profile except provide concave profile at doors with push-button locksets.
 3. Material: Stainless steel housing with rubber insert.

2.13 THRESHOLDS

- A. Manufacturers:
1. Pemko; an Assa Abloy Group company: www.assaabloydss.com/#sle.
 2. Hager Companies: www.hagerco.com/#sle.
 3. National Guard Products, Inc: www.ngpinc.com/#sle.
 4. Reese Enterprises, Inc: www.reeseusa.com/#sle.
 5. Zero International, Inc: www.zerointernational.com/#sle.
 6. Substitutions: Not permitted.
- B. Thresholds: Comply with BHMA A156.21.
1. Provide threshold at each exterior door, unless otherwise indicated.
 2. Type: Flat surface.
 3. Material: Aluminum.

4. Threshold Surface: Fluted horizontal grooves across full width
5. Field cut threshold to profile of frame and width of door sill for tight fit.
6. Provide non-corroding fasteners at exterior locations.

2.14 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:

1. Pemko; an Assa Abloy Group company: www.assaabloydss.com.
2. National Guard Products, Inc: www.ngpinc.com.
3. Reese Enterprises, Inc: www.reeseusa.com/#sle.
4. Zero International, Inc: www.zerointernational.com.
5. Substitutions: Not permitted.

B. Weatherstripping and Gasketing: Comply with BHMA A156.22.

1. Head and Jamb Type: Self-adhesive or encased in retainer, easily replaceable, as indicated in Hardware Schedule at the end of this Section.
2. Door Sweep Type: Encased in retainer.
3. Material: Aluminum.
4. Provide weatherstripping on each exterior door at head, jambs, and meeting stiles of door pairs, unless otherwise indicated.
5. Provide door bottom sweep on each exterior door, unless otherwise indicated.
6. Provide weatherstripping on active leafs with astragals, unless otherwise indicated.

2.15 SILENCERS

A. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.

1. Single Door: Provide three on strike jamb of frame.
2. Pair of Doors: Provide two on head of frame, one for each door at latch side.
3. Material: Rubber, gray color.

2.16 KEY CONTROL SYSTEMS

A. Key Control Systems: Comply with guidelines of BHMA A156.28.

1. Provide keying information in compliance with DHI (KSN) standards.
2. Keying: Master keyed.
3. Include construction keying.
4. Key to existing keying system.
5. Supply keys in following quantities:
 - a. 5 each Master keys.
 - b. 10 each Construction keys (where required).
 - c. 2 each Construction Control keys.
 - d. 2 each Control keys if new system.
 - e. 3 each Change keys for each keyed core.
6. Construction Keying:
 - a. Provide construction master keyed cylinders.
 - b. Provide temporary keyed construction cores.
7. Key Registration List (Bitting List):
 - a. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - b. Provide transcript list in writing or electronic file as directed by the Owner.

8. Security Key Tags: For each keyed lock on project, provide one set of matching key tags for permanent attachment to one key of each set.

2.17 FASTENERS

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws.
- B. Provide screws according to manufacturers recognized installation standards for application intended.
- C. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

2.18 FINISHES

- A. Finishes: Comply with BHMA A156.18 , including coordination with traditional U.S. finishes indicated by certain manufacturers for their products, as identified in the Hardware Schedule at the end of this Section.
- B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
- C. Notify Architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ABHMA A156.115.

3.3 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions.
 1. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work.
 2. Do not install surface-mounted items until finishes have been completed on substrates involved.
- C. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

- D. Use templates provided by hardware item manufacturer.
- E. Do not install surface mounted items until application of finishes to substrate are fully completed.
- F. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list, unless noted otherwise on drawings.
 - 1. For Steel Doors and Frames: See Section 08 1113.
 - 2. Mounting heights in compliance with ADA Standards:
 - a. Locksets: 40-5/16 inches.
 - b. Push Plates/Pull Bars: 42 inches.
 - c. Deadlocks (Deadbolts): 48 inches.
 - d. Exit Devices: 40-5/16 inches.
- G. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.
 - 1. See Section 07 9200 for additional requirements.

3.4 FIELD QUALITY CONTROL

- A. Perform field inspection and testing under provisions of Section 01 4000 - Quality Requirements.
- B. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.5 ADJUSTING

- A. Adjust work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.6 CLEANING

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.7 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals for additional submittals.
- B. See Section 01 7900 - Demonstration and Training for additional requirements.
- C. Demonstration and Training: Provide manufacturer's field representative to demonstrate to and train Owner's operating personnel in proper operation of equipment.
 - 1. Location: On site using installed equipment.
 - 2. Time: As agreed between Owner and Contractor.
 - 3. Demonstration: One cycle consists of fully-opening and fully closing (stacking) the bleacher assembly; demonstrate that assembly is capable of completing ten consecutive cycles of proper operation with Owner present.

- a. If adjustments during demonstration are required for proper operation, complete in accordance with manufacturer's recommendations and start demonstration cycle over.

3.8 PROTECTION

- A. Protect finished Work under provisions of Section 01 7000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

3.9 HARDWARE SCHEDULE

- A. Provide hardware for each door to comply with the requirements for design, grade, function, finish, size, and other characteristics of each type of finish hardware as indicated in the following Hardware Schedule.
- B. Hardware sets indicate quantity, item, manufacturer and product designation, size, and finish or color, as applicable.
- C. Manufacturer's product designation: Manufacturers are listed for hardware items to establish minimum requirements. Provide product designated or equivalent product of another manufacturer listed in Part 2 for specific hardware category.
 - 1. Manufacturer's Abbreviations:
 - a. (MK): McKinney, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - b. (OT): Other.
 - c. (PE): Pemko, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - d. (RO): Rockwood Manufacturing Company; www.rockwoodmfg.com.
 - e. (YA): Accentra (formerly Yale): an Assa Abloy Group company: www.assaabloydss.com/#sle.
- D. Hardware Schedule: Refer to the following pages.

Hardware Sets

Set: 1.0

Doors: 103

6 Hinge, Hvy Wt	T4A3786 (Size/NRP as req'd)	US26D	MK
1 Removable Mullion	KRM200	600	YA
1 Rim Exit Device, Nightlatch	6100ED 121NL x Temp SFIC	630	YA
1 Rim Exit Device, Exit Only	6100ED EO	630	YA
2 Core	A600	626	YA
1 Mortise Cylinder	A620 x Temp Core	630	YA
1 Vandal Resistant Trim	VRT16 C	US32D	RO
1 Vandal Resistant Trim	VRT16	US32D	RO
2 Surface Closer	2731	689	YA
2 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Gasketing	303AS		PE
1 Rain Guard	346A		PE
1 Mullion Gasketing	5110BL		PE
2 Sweep	315CN		PE
1 Threshold	171A or as detailed		PE

Set: 2.0

Doors: 201A, 201E, 201F, 201K, 101B, 101C, 101D, 101E

3 Hinge, Hvy Wt	T4A3786 (Size/NRP as req'd)	US26D	MK
1 Rim Exit Device, Nightlatch	6100ED 121NL x Temp SFIC	630	YA
1 Core	A600	626	YA
1 Vandal Resistant Trim	VRT14 C	US32D	RO
1 Surface Closer	2731	689	YA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Gasketing	303AS		PE
1 Rain Guard	346A		PE
1 Sweep	315CN		PE
1 Threshold	171A or as detailed		PE

Set: 3.0

Doors: 109B, 109C

3 Hinge, Hvy Wt	T4A3786 (Size/NRP as req'd)	US26D	MK
1 Storeroom Lock	AU 4605LN x Temp SFIC	626	YA
1 Core	A600	626	YA
1 Surface Closer	2731	689	YA
1 Armor Plate	K1050 34" high CSK BEV	US32D	RO
1 Gasketing	303AS		PE
1 Sweep	315CN		PE
1 Threshold	171A or as detailed		PE

Set: 4.0

Doors: 201L, 201M

3 Hinge, Hvy Wt	T4A3786 (Size/NRP as req'd)	US26D	MK
1 Classroom Lock	AU 4608LN x Temp SFIC	626	YA
1 Core	A600	626	YA
1 Surface Closer	2731	689	YA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Gasketing	303AS		PE
1 Sweep	315CN		PE
1 Threshold	171A or as detailed		PE

Set: 5.0

Doors: 108

6 Hinge	TA2714 (Size/NRP as req'd)	US26D	MK
1 Dust Proof Strike	570	US26D	RO
2 Manual Flush Bolt	555/557	US26D	RO
1 Storeroom Lock	AU 4605LN x Temp SFIC	626	YA
1 Core	A600	626	YA
2 Surface Closer	2701	689	YA
2 Kick Plate	K1050 10" high CSK BEV	US32D	RO
2 Door Stop	406/409/441H per condition	US26D	RO
1 Astragal	355CS		PE
2 Silencer	608-RKW		RO

Set: 6.0

Doors: 109A

3 Hinge	TA2714 (Size/NRP as req'd)	US26D	MK
1 Entry Lock	AU 4607LN x Temp SFIC	626	YA
1 Core	A600	626	YA
1 Surface Closer	2701	689	YA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Door Stop	406/409/441H per condition	US26D	RO
3 Silencer	608-RKW		RO

Set: 7.0

Doors: 106

3 Hinge	TA2714 (Size/NRP as req'd)	US26D	MK
1 Privacy w/ Indicator	AU YPL02	626	YA
1 Surface Closer	2701	689	YA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Door Stop	406/409/441H per condition	US26D	RO
1 Gasketing	S88BL		PE

Set: 8.0

Doors: 104

3 Hinge, Hvy Wt	T4A3786 (Size/NRP as req'd)	US26D	MK
1 Pull Plate	BF 111x70C	US32D	RO
1 Push Plate	70F	US32D	RO
1 Surface Closer	2701	689	YA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Door Stop	406/409/441H per condition	US26D	RO
1 Gasketing	S88BL		PE

Set: 9.0

Doors: 105

3 Hinge, Hvy Wt	T4A3786 (Size/NRP as req'd)	US26D	MK
1 Pull Plate	BF 111x70C	US32D	RO
1 Push Plate	70F	US32D	RO
1 Surface Closer	2731	689	YA
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO
1 Gasketing	S88BL		PE

Set: 10.0

Doors: 201B, 201C, 201D, 201G, 201H, 201J

1 Hardware

By Overhead Door Mfg.

OT

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal stud framing.
- B. Z-furring system.
- C. Metal channel ceiling framing.
- D. Gypsum board.
- E. Joint treatment and accessories.

1.2 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2018).
- B. AISI S220 - North American Standard for Cold-Formed Steel Framing - Nonstructural Members; 2015.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017.
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
- F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2020.
- H. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
- I. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
- J. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2019.
- K. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- L. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- M. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.

1.3 SUBMITTALS

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

- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of experience.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.

2.2 METAL FRAMING MATERIALS

- A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel.
 - 1. Studs and Track:
 - a. Studs: "C" shaped with flat or formed webs.
 - b. Size: As indicated.
 - c. Spacing: 16 inches on center unless indicated otherwise.
 - d. Base Steel Thickness:
 - 1) 2-1/2 inch studs:
 - (a) Stud height up to 10 feet: 0.0296 inch (30 mil), minimum.
 - (b) Stud height more than 10 feet and up to 12.0 feet: 0.0329 inch (33 mil), minimum.
 - (c) Stud height more than 12.0 feet: Not allowed.
 - 2) 3-5/8 inch studs:
 - (a) Stud height up to 15 feet: 0.0296 inch (30 mil), minimum.
 - (b) Stud height more than 15 feet and up to 24.0 feet: 0.0329 inch (33 mil), minimum.
 - (c) Stud height more than 24.0 feet: Not allowed.
 - 3) 6 inch studs:
 - (a) Stud height up to 22 feet: 0.0296 inch (30 mil), minimum.
 - (b) Stud height more than 22 feet and up to 24.0 feet: 0.0329 inch (33 mil), minimum.
 - (c) Stud height more than 24.0 feet: Not allowed.
 - e. Track: U shaped, depth and gage to match studs.
 - 1) Curved Substrate: Provide corrosion-resistant steel, U-shaped, hand-bendable for curved walls and soffits; depth and gage to match studs.
 - f. Protective Coating: Comply with AISI S220, ASTM A653/A653M, G40 (Z120) or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
 - 1) Equivalent coatings: Provide third party evaluation report (e.g. ICC ES report) acceptable to authority having jurisdiction.
 - g. Equivalent Gage ("EQ") Non-Structural Studs and Track: Not allowed.
 - 2. Metal Framing Connectors and Accessories:
 - a. Same manufacturer as framing.
 - 3. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.

- a. Thickness: Match wall framing unless indicated otherwise.
- 4. Deep Leg Track (Partition Head to Structure Connections): Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
 - a. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
 - b. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
 - c. Spacing Bars: Formed 33 mil galvanized angles, engineered to resist deflection and stud rotation at the deep leg track of stud walls, prenotched to match stud spacing and rigidly hold studs in place without fasteners.
- B. Non-structural Framing Accessories:
 - 1. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.

2.3 BOARD MATERIALS

- A. Gypsum Board: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold resistant board is required at all locations.
 - 3. Type: Type X.
 - 4. Thickness: 5/8 inch.

2.4 GYPSUM BOARD ACCESSORIES

- A. Clip Angles: Formed angles from galvanized steel or rolled zinc sheets, gage to match metal framing; of configuration indicated.
- B. Trim, Cornerbead, and Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless otherwise indicated.
 - 1. Types: As detailed or required for finished appearance.
 - 2. Special Shapes: In addition to conventional cornerbead and control joints, provide L-bead and LC-bead at exposed panel edges.
- C. Joint Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 1. Corner Beads: Low profile, for 90 degree outside corners.
 - 2. L-Trim with Tear-Away Strip: Sized to fit 5/8 inch thick gypsum wallboard.
 - 3. Expansion Joints:
 - a. Type: V-shaped, roll-formed zinc, 3/16 inch wide opening, 7/16 inch deep, with 3/32 inch grounds and factory-installed protective tape.
 - 4. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - a. Paper Tape: 2 inch wide, creased paper tape for joints and corners of gypsum board.
 - 5. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
 - 6. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.

7. Powder Actuated Anchorage Device(s) for Masonry and Concrete: Knurled, ballistic point with pre-mounted steel washers.
8. Anchorage to Substrate: Secure framing components to substrate with tie wire, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.2 CUTTING & PATCHING

- A. Repair existing damaged gypsum board and gypsum board finishes to match original condition. Fill holes, cuts, cracks, dents, and other irregularities.
- B. Repair or replace damaged corner bead, trim, control joints, and other accessories to match original condition.
- C. Where replacement of gypsum board is necessary, match type, thickness, and finish of original gypsum board.
- D. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching.

3.3 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Studs: Space studs at 16 inches on center unless indicated otherwise.
 1. Extend partition framing to structure unless indicated otherwise.
 2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- D. Hat-Shaped Furring Channels: Install at locations indicated, not more than 4 inches from floor and ceiling lines and abutting walls.
 1. Orientation: Horizontal.
 2. Spacing: At 16 inches on center.
- E. Bracing, Furring, Bridging: Formed sheet steel, gage and finish to match framing components.
- F. Plates, Gussets, Clips: Sheet Steel, 16 gage; finish to match framing components.

3.4 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board perpendicular to framing, with ends and edges occurring over firm bearing.

3.5 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.6 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.7 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 9000
PAINTING AND COATING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne, and lead items.
 - 6. Floors, unless specifically so indicated.
 - 7. Glass.
 - 8. Concealed pipes, ducts, and conduits.
- E. See Schedule - Surfaces to be Finished, at end of Section.

1.2 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.
- B. General: Standard coating terms defined in ASTM D16.
 - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85 degree meter.
 - 2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60 degree meter.
 - 3. Satin and low sheen paints are similar to eggshell paints, but have a slightly higher gloss.
 - 4. Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60 degree meter.
 - 5. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60 degree meter.
- C. The following definitions are in addition to the terms defined in ASTM D16:
 - 1. Buried - Covered with earth.
 - 2. Exposed or Exposed Surfaces - Areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.

1.3 REFERENCE STANDARDS

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.

- B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- C. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- D. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on all finishing products and special coatings to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, sheen, description, and characteristics.
 - 2. Cross-reference to specified paint system(s) products to be used: Identify each product as a component of the appropriate paint numbering system in Part 2 of this Section (i.e., Paint System "GI-OP-3LA-3 and GI-OP-3LA-4," etc.). Unidentified products will result in rejection of the entire submittal.
- C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- D. Manufacturer's Data: Indicate special surface preparation procedures, substrate conditions requiring special attention, and dry film thickness of installed products.
- E. Maintenance Data: Submit data including product technical data sheets, care and cleaning instructions, touch-up procedures, and repair of painted and finished surfaces.
- F. Qualification Data: For firms and persons specified in the Quality Assurance Article to demonstrate their capabilities and experience. Include lists of completed projects, with project names and addresses, names and addresses of architects or engineers and owners, and other specified information.

1.5 QUALITY ASSURANCE

- A. Provide paint and coating products used in any individual system from the same manufacturer .
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years documented experience.

1.6 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame and smoke rating and VOC requirements for products and finishes.
- B. Lead, Heavy Metals, Cadmium, and Chromates: Lead, Heavy Metals, Cadmium, and Chromate content of painting materials shall not exceed amount permitted by federal, state, and local authorities.
- C. Comply with governing code requirements for air quality and material disposal regulations.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
- D. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 degrees F and 90 degrees F.
- E. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 degrees F and 95 degrees F.
- F. Provide fire extinguishers and post caution signs warning against smoking and open flame when working with flammable materials.
- G. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1.8 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers - Provide paint and coating products by one of the following:
 - 1. Benjamin Moore & Co. (Moore): www.benjaminmoore.com.
 - 2. PPG Paints (PPG): www.ppgpaints.com.
 - 3. Pratt & Lambert Paints (P&L): www.prattandlambert.com.
 - 4. Sherwin-Williams Company: www.sherwin-williams.com.
- B. Primer Sealers: Same manufacturer as top coats.
- C. Substitutions: Not permitted.

2.2 PAINTS AND COATINGS - GENERAL

- A. Paint exposed surfaces, except where the Paint Schedule indicates that a surface or material is not to be painted or is to remain natural. If the Paint Schedules does not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not the Schedules indicates color(s). If the Schedule does not indicate color(s) or finishes, the Architect will select from standard colors and finishes available.
- B. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- C. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
 - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. Supply each coating material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- D. Sheens: Provide sheen specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: As indicated in Color Schedule.
- F. Metals encased in concrete shall only receive a primer compatible with the covering material.
- G. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience
 - 1. Review other Sections of these Specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Contractor shall be responsible for the compatibility of all shop primed and field painted items.
 - 2. Furnish information on the characteristics of the finish materials proposed to use, to ensure that compatible prime coats are used. Provide Tie coats over incompatible primers or remove and reprime as required. Notify Architect, in writing, of anticipated problems using the coating systems as specified with substrates primed by others.
- H. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.
 - 1. Damage or defaced painted surfaces: Touch up and restore painted surfaces as specified in Section 01 7000.

2.3 PAINT SYSTEMS

- A. Paint System GI-OP-3LA-3: Gypsum Board/Plaster, Latex-Acrylic, 3 Coats.
 - 1. First coat: ProMar 200 Zero VOC Latex Primer, Sherwin Williams; 1.0 dry mils.
 - 2. Second and third coats: ProMar 200 Zero VOC Interior Latex Semi-Gloss, Sherwin Williams; 1.7 dry mils per coat.
 - 3. Sheen: Semi-Gloss.

- B. Paint System GI-OP-3LA-4: Gypsum Board/Plaster, Latex-Acrylic, 3 Coats.
 - 1. First coat: ProMar 200 Zero VOC Latex Primer, Sherwin Williams; 1.0 dry mils.
 - 2. Second and third coats: ProMar 200 Zero VOC Interior Latex Eg-Shel, Sherwin Williams; 1.7 dry mils per coat.
 - 3. Sheen: Eggshell.
- C. Paint System ME-OP-2AC-1: Ferrous Metals, Previously-Painted Metals, Factory-Finished Metals, and Galvanized Metals, Waterborne Acrylic, 2 Coats:
 - 1. VOC Content: Less than 150 g/L.
 - 2. Surface Preparation: Solvent clean surfaces per SSPC-SP 1 except at rusty surfaces hand tool clean surfaces per SSPC-SP 2 and spot prime the area the same day as cleaned.
 - a. Spot prime bare ferrous and galvanized metals with Pro Industrial Pro-Cryl Universal Primer, B66-310, Sherwin Williams; 1.8 - 3.6 dry mils.
 - 3. First coat: Pro Industrial Pro-Cryl Universal Primer, B66-310, Sherwin Williams; 1.8 - 3.6 dry mils.
 - 4. Second coat: Pro Industrial Acrylic B66-660 Series, Sherwin Williams; 2.1-4.2 dry mils per coat.
 - 5. Sheen: Gloss.
- D. Paint System WE-OP-3L-1: Wood, Opaque, Latex, 3 Coats:
 - 1. One coat of latex primer sealer: Exterior Latex Wood Primer, Sherwin Williams; 1.4 dry mils.
 - 2. Second and third coats: A-100 Exterior Latex Low Sheen, Sherwin Williams; 1.4 dry mils per coat.
 - 3. Sheen: Low sheen.
- E. Paint System WI-TR-2P: Wood, Transparent, Water Based Polyurethane, Non-Yellowing, No Stain, 2 Coats:
 - 1. First and second coats: Minwax Water Based Oil-Modified Polyurethane Satin, Sherwin Williams.
 - 2. Sheen: Satin.

2.4 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Test previously painted and factory painted surfaces for compatibility with subsequent cover materials.
- G. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 8 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing coatings that exhibit surface defects.
- D. Perform all preparation and cleaning procedures as specified herein and in strict accordance with the paint manufacturer's instructions for each particular substrate and atmospheric condition.
- E. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.
- F. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- G. Surfaces: Correct defects and clean surfaces which affect work of this section.
- H. Marks: Seal marks which may bleed through surface finishes with tie coat compatible with paint.
- I. Impervious Surfaces: Remove mildew in accordance with paint manufacturer's recommendations.
- J. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- K. Concrete and Unit Masonry Surfaces to be Painted: Allow new concrete and masonry to cure 28 days. Remove stains, oil, grease, dirt, loose mortar, scale, salt or alkali powder, and other foreign matter in accordance with paint manufacturer's recommendations. Do not use wire brushes for preparation or cleaning.
 - 1. Do not paint over surfaces where the moisture content exceeds 8 percent, unless otherwise permitted in the manufacturer's printed instructions.
- L. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- M. Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of rust pre-treatment as recommended by paint manufacturer, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
 - 1. Any spot measurement found below the required minimum dry film thickness shall be repainted by the Contractor in accordance with the manufacturer's instructions, at no additional cost to the Owner.
- B. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Provide sharp lines of delineation at color breaks and between different materials.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 FIELD QUALITY CONTROL

3.5 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.6 PROTECTION

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.

3.7 SCHEDULE - PAINT SYSTEMS

- A. Paint System ME-OP-2AC-1:
 - 1. Exterior and Interior:
 - a. Pre-engineered building jamb and head framing members exposed to weather. Exterior structural steel at grandstands and visitor grandstands: Finish all surfaces.
 - b. Galvanized and ferrous metals, primed and unprimed, for which no other paint system is indicated.
- B. Paint System GI-OP-3LA-3:
 - 1. Interior gypsum board walls, ceilings, and bulkheads at the following locations :
 - a. Garages.
 - b. Laundry rooms.
 - c. Mechanical and electrical rooms.
 - d. Toilets and bathrooms.
 - e. Utility rooms.
- C. Paint System GI-OP-3LA-4:
 - 1. Interior gypsum board walls, ceilings, and bulkheads at the following locations:

- a. Gypsum board in areas for which no other paint is specified.
- 2. Exceptions:
 - a. Gypsum board indicated to receive Paint System GI-OP-3LA-3.
- D. Paint System WE-OP-3L-1:
 - 1. Interior:
 - a. Finish carpentry MDF standing and running trim.
 - b. Finish carpentry MDF closet shelving.
 - c. Prehung MDF doors and frames.
- E. Paint System WI-TR-2P:
 - 1. Interior:
 - a. Finish carpentry hardwood treads, risers, railings, stringers, balusters, and trim used at stairways.
 - b. Finish carpentry items for which no other paint system is indicated.

3.8 SCHEDULE - COLORS

- A. Interior Colors: Except as noted below provide colors as selected by Architect from full range of manufacturer's standards.
 - 1. Bathrooms, utility rooms: SW 7757 High Reflective White, Sherwin Williams.
 - 2. Standing and Running Trim: SW 7757 High Reflective White, Sherwin Williams.
 - 3. Closet Shelving: SW 7757 High Reflective White, Sherwin Williams.

END OF SECTION

SECTION 10 1416 PLAQUES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plaques.

1.2 REFERENCE STANDARDS

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of plaque sign, indicating style, font, foreground and background colors, locations, and overall dimensions of each sign.
- C. Shop Drawings: Indicate dimensions, locations, elevations, materials, text and graphic layout, and attachment details.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Plaques:
 - 1. Architectural Bronze and Aluminum Corp: www.architecturalbronze.com.
 - 2. A.R.K. Ramos Architectural Signage Systems: www.arkramos.com/#sle.
 - 3. Century Sign Builders: www.csbsigns.com.
 - 4. Gemini, Incorporated: www.geminisignproducts.com.
 - 5. Substitutions: Not permitted.

2.2 PLAQUES

- A. Metal Plaques:
 - 1. Material: Aluminum casting.
 - 2. Material Thickness: 3/4 inch, minimum.
 - 3. Size: As indicated
 - 4. Text and Typeface:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 - b. Character Case: Upper case only.
 - c. Character Color: Contrast with background color.
 - d. Character Finish: Satin aluminum.
 - 5. Graphics: Bas relief, fully painted.
 - a. Graphics: Digital image will be provided to Contractor electronically by Architect.
 - b. Finish: Baked enamel.
 - 1) Color: Multiple colors; match colors from Architect's digital image.
 - 6. Border Style: Double line.
 - 7. Background Texture: Stipple.
 - 8. Corners: Square.
 - 9. Mounting: Blind studs.

10. Fabricate castings with smooth, flat faces, sharp corners, and precisely formed lines and profiles, free from pits, scale, sand holes, or other defects. Cast lugs into the back of the casting and tap to receive threaded mounting studs.
11. Location: As indicated on drawings.

END OF SECTION

SECTION 10 1427
POST AND PANEL SIGNS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-illuminated building-mounted panel signs.

1.2 RELATED SECTIONS

1.3 REFERENCES

- A. Americans with Disabilities Act (Public Law 101-336, 104 Stat. 327 (July 26, 1990), codified at 42 U.S.C. § 12101 et seq); 1990.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.

1.4 DESIGN REQUIREMENTS

- A. Design Criteria: Design, fabricate, and install exterior post and panel signs to withstand a wind velocity of 100 mph (160 km/h) on the total sign area, in all directions.

1.5 SUBMITTALS

- A. See Section 01 3000 for submittal procedures.
- B. Product Data: For each type of sign specified, including details of construction, dimensions of individual components, profiles, finishes, and manufacturer's standard color charts.
- C. Shop Drawings: For each type of post and panel sign indicated.
 - 1. Provide plans, elevations, and at least 3/4-inch (1:20) scale sections of typical members and other components. Show anchors, reinforcement, accessories, layout, and installation details
 - 2. Show required location of fasteners.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Width of signs attached to common post(s) must be identical.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Delivery: Provide protective covering or crating as recommended by the manufacturer to protect sign components and surfaces against damage during transportation and delivery.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. ASI Sign Systems, Inc.; www.asisign.com
- B. Best Manufacturing Company; www.bestsigns.com.

- C. Mohawk Sign Systems; www.mohawksign.com.
- D. Seton Identification Products; www.seton.com.
- E. Substitutions: See Section 01600 - Product Requirements.

2.2 PANEL SIGNS

- A. Panels: Provide smooth, even, level sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16-inch measured diagonally from corner to corner.
 - 1. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.
 - 2. Aluminum fabricated monument with foundation
 - 3. Lexan panels vinyl graphics, concrete foundation, mounting pipes, connect to elec120 v 20 amp circuit NEC code, aluminum sheet, fabricated aluminum angle iron frame, aluminum divider bars between panels, prefinished aluminum or texture coat shopfinished

2.3 RAISED LETTER SIGNS

- A. Materials: Cast aluminum or cast zinc metal alloy.
 - 1. Raised Copy, Graphics, Pictograms, and Braille: Use heat and pressure laminated photopolymer film system formed to comply with the requirements indicated for size, proportions, spacing, content, and style. Applied characters or Braille plates are not acceptable.
 - a. Signs featuring the International Symbol of Accessibility must comply with character height, proportion, symbols, finish, Braille, and other signage requirements of ANSI/ICC A117.1 and the Americans with Disabilities Act (ADA). Where Braille characters are indicated, provide Grade 2 Braille translation.
- B. Total Thickness: 1/8 inch, minimum.
- C. Sign Size: As indicated.
- D. Face Color: Blue, equal to Color No. 15090 in Federal Standard 595B.
- E. Edges: Radiused
 - 1. Edge Color: Same as face color.
 - 2. Corners: Corners rounded to 3/8 inch radius.
- F. Raised Character Size and Style:
 - 1. Character Color: White.
 - 2. Character Thickness: Not less than 1/32 inch.
 - 3. Height: 1 inch, minimum.
 - 4. Edges: Square.
 - 5. Character Font: Sans Serif or Simple Sans Serif.
 - 6. Character Case: Upper case only.
- G. Raised Graphics and Pictograms:
 - 1. Color: White.
 - 2. Raised Thickness: Not less than 1/32 inch.
 - 3. Graphic and Pictogram Height: 6 inches, minimum.
- H. Raised Braille:
 - 1. Color: White.

2. Raised Thickness: Not less than 1/32 inch.
3. Braille Symbols: Contracted Grade II Braille with dots in conformance with ANSI A117.1.

2.4 COMPONENTS

2.5 ACCESSORIES

- A. Fasteners: Surface-mounted, nonferrous metal or hot-dip galvanized; provide types indicated for mounting signs to substrates indicated:

PART 3 EXECUTION

3.1 EXAMINATION

- A. Locate sign units and accessories where indicated, using mounting methods of type described and complying with manufacturer's written instructions.

3.2 PREPARATION

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install signs level, plumb, and at height indicated, with surfaces free from distortion or other defects in appearance.

END OF SECTION

SECTION 10 2113.13
METAL TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal toilet compartments.
- B. Urinal screens.

1.2 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- C. ICC A117.1-2009 - Accessible and Usable Buildings and Facilities; 2009.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and floor supports, door swings.
 - 1. Indicate concealed reinforcement type and locations for attachment of toilet accessories.
 - 2. Include details of panel connections at floors and walls.
 - 3. Demonstrate components and accessible routes are in compliance with ICC A117.1-2009.
- C. Product Data: Provide data on panel construction, hardware, and accessories.
- D. Samples: Submit two samples of partition panels, 4 by 4 inch in size illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

1.5 PROJECT CONDITIONS

- A. Obtain toilet and bath accessory manufacturer's installation instructions and installation templates for accessories to be installed in partitions; provide instructions and templates to installer before beginning construction activities of this section.

1.6 WARRANTY

- A. Stainless Steel Toilet Partitions: 5 years against defects in material and workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design - Metal Toilet Compartments: Standard 58" Headrail Braced Anti-Graffiti, pedestal-mounted, and latch kit, as specified herein and manufactured by Hadrian Inc: www.hadrian-inc.com.
 - 1. Other Acceptable Products:
 - a. The Corinthian, FP-500 Overhead Braced, 5SM Pattern Stainless Steel Finish, Metpar Corporation: www.metpar.com.
- B. Substitutions: Section 01 6000 - Product Requirements.

2.2 MATERIALS

- A. Steel Sheet: Zinc-Coated steel, galvalume, ASTM A653/A653M.

2.3 COMPONENTS

- A. Toilet Compartments: Powder coated steel, pedestal floor mounted, overhead braced.
 - 1. Provide components compliant with ICC A117.1-2009.
- B. Doors, Panels, and Pilasters: Sheet steel faces, pressure bonded to sound deadening core, formed and closed edges; corners made with corner clips or mitered, welded, and ground smooth.
 - 1. Panel Faces: 22 gage, 0.0299 inch.
 - 2. Door Faces: 22 gauge, 0.0299 inch.
 - 3. Pilaster Faces: 18 gage, 0.0478 inch.
 - 4. Reinforcement: 12 gauge, 0.1046 inch.
 - 5. Internal Reinforcement: Provide in areas of attached hardware and fittings. Mark locations of reinforcement for partition mounted washroom accessories.
- C. Door and Panel Dimensions:
 - 1. Thickness: 1 inch.
 - 2. Door Width: 24 inch.
 - 3. Door Width for Handicapped Use: 36 inch.
 - 4. Height: 58 inches.
 - 5. Panel Mounting Height: 9 inches above finish floor.
- D. Pilasters: 1-1/4 inch thick, of sizes required to suit compartment width and spacing.
- E. Pedestal: 9" height, installed on panel sheets 8" inside from front face.
- F. Urinal Screens: Wall mounted panel with continuous wall bracket and vertical upright consisting of tubular stainless steel support post anchored to floor.
 - 1. Panel fabrication: Match toilet compartment panel.
 - 2. Panel size: 24 inches wide by 48 inches high mounted 12 inches above finish floor.
 - 3. Urinal Screen Support Posts: Formed tube, 2 by 2 by 0.188 thick with continuous wall bracket; floor and ceiling mounted.
 - a. Material:
 - 1) Formed ASTM A666 Type 304 stainless steel with No. 4 finish.
 - 2) Post Shoes and Brackets: Single piece casting with mounting flanges, surface-mounted.
 - (a) Floor Post Shoe: Stainless steel with No. 4 finish; anchored to slab.
 - (b) Anchors at Slabs: Stainless steel expansion type.

- 3) Post Shoes: Formed ASTM A 666, Type 304 stainless steel with No. 4 finish, 4 inches high, concealing floor fastenings.
- b. Height: Match urinal screen height.

2.4 ACCESSORIES

- A. Pilaster Shoes: Formed ASTM A666, Type 304 stainless steel with No. 4 finish, 4 inch high, concealing floor fastenings.
 - 1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
- B. Head Rails: Hollow stainless steel tube, 1 by 1-5/8 inch size, with anti-grip strips and cast socket wall brackets.
- C. Brackets: Satin stainless steel.
 - 1. Provide continuous channel, heavy duty wall brackets.
- D. Attachments, Screws, and Bolts: Stainless steel.
 - 1. For attaching pilasters and posts to floors: Expansion anchors.
 - 2. For attaching brackets to framed walls: Lag bolts anchored to concealed blocking.
 - 3. For attaching panels and pilasters to brackets: Through-bolts and nuts.
- E. Hardware: Satin stainless steel:
 - 1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
 - a. Pins: Threaded stainless steel.
 - 2. Nylon bearings.
 - 3. Latch: Thumb turn, ADA compliant, fastened with screw.
 - 4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
 - 5. Coat hook with rubber bumper; one per compartment, mounted on door.
 - 6. Provide door pull for outswinging doors.
- F. Wood blocking support members in walls: As specified in Section 06 1000 - Rough Carpentry.

2.5 FINISHING

- A. Stainless Steel Compartments: No. 4 finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that field measurements are as indicated.
- C. Verify correct spacing of and between plumbing fixtures.
- D. Framed Walls and Ceilings: Verify concealed blocking is provided at proper locations for mounting brackets.
- E. Verify correct location of built-in framing, anchorage, and bracing.

3.2 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

- B. Maintain 3/8 to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets.
- E. Field touch-up of scratches or damaged enamel finish will not be permitted. Replace damaged or scratched materials with new materials.

3.3 TOLERANCES

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

3.4 ADJUSTING

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 2600
WALL AND DOOR PROTECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Corner guards.

1.2 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, and anchorage details.
- C. Shop Drawings: Include plans, elevation, sections, and attachment details.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.
- C. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.4 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Corner Guards:
 - 1. Babcock-Davis; _____: www.babcockdavis.com/#sle.
 - 2. Construction Specialties, Inc; Acrovyn Solid Color and Chameleon Crash Rails: www.c-sgroup.com/#sle.
 - 3. Inpro; _____: www.inprocorp.com/#sle.
 - 4. Substitutions: Not permitted.

2.2 PRODUCT TYPES

- A. Corner Guards - Surface Mounted:
 - 1. Material: High impact vinyl with full height extruded aluminum retainer.
 - 2. Width of Wings: 2.0 inches.
 - 3. Corner: Square.
 - 4. Color: As selected from manufacturer's standard colors.
 - 5. Length: 48 inches, one piece.
 - 6. Mounting: Adhesive.

7. Locations: As indicated on the Drawings.

2.3 FABRICATION

- A. Fabricate components in one piece, pre-formed, pre-drilled with no sharp edges.
 - 1. Preformed end caps: Fabricate in custom-sizes to match wall thickness.

2.4 ACCESSORIES

- A. Adhesive: Low VOC type construction adhesive as recommended by manufacturer.

2.5 SOURCE QUALITY CONTROL

- A. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces for adhered items are clean and smooth.
- B. Start of installation constitutes acceptance of project conditions.

3.2 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Apply continuous bead of adhesive in zig-zag pattern to back of corner guard wings.
- C. Position bottom of corner guard tight to top of wall base.
- D. Use a roller to ensure maximum contact with adhesive.

3.3 TOLERANCES

- A. Maximum Variation From Required Height: 1/8 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/8 inch.

3.4 CLEANING

- A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

SECTION 10 2800
TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial toilet accessories.
- B. Under-lavatory pipe supply covers.
- C. Diaper changing stations.
- D. Utility room accessories.

1.2 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Concealed nailers and supports for accessories.
- B. Section 10 2113.13 - Metal Toilet Compartments.

1.3 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- C. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a (Reapproved 2019).
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- E. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2018, with Editorial Revision (2021).
- F. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.
- G. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- H. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2018.
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.6 COORDINATION

- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide the following products from the same manufacturer:
 - 1. Toilet paper dispensers.
 - 2. Paper towel dispensers.
 - 3. Grab bars.
 - 4. Mirrors.
 - 5. Sanitary napkin disposal units.
 - 6. Mop and broom holders.
- B. Commercial Toilet, Shower, and Bath Accessories:
 - 1. Bradley Corporation: www.bradleycorp.com.
 - 2. Bobrick Washroom Equipment, Inc.: www.bobrick.com.
- C. Diaper Changing Stations:
 - 1. Bradley Corporation: www.bradleycorp.com/#sle.
 - 2. Bobrick Washroom Equipment, Inc.: www.bobrick.com.
 - 3. Foundations Worldwide, Inc : www.brocar.com.
 - 4. Koala Kare Products: www.koalabear.com/#sle.

2.2 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Keys: Provide 2 keys for each accessory to Owner.
- C. Stainless Steel Sheet: ASTM A666, Type 304.
- D. Stainless Steel Tubing: ASTM A269/A269M, Type 304 or 316.
- E. Zinc Alloy: Die cast, ASTM B86.
- F. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- G. Concealed Fasteners, Screws, and Bolts: Hot dip galvanized.
- H. Exposed Fasteners, Screws, and Bolts: Stainless steel.
- I. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.

- C. Powder-Coated Steel: Clean, degrease, and neutralize. Follow immediately with a phosphatizing treatment, prime coat, and two finish coats of powder coat enamel.
- D. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.

2.4 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Double roll, surface mounted bracket type, satin finished cast aluminum brackets.
 - 1. Spindles: High-impact molded plastic, theft-resistant, with concealed locking feature.
 - 2. Product: B-2740, Bobrick Washroom Equipment, Inc.
- B. Paper Towel Dispenser: Folded paper type, stainless steel, surface-mounted, with viewing slots on sides as refill indicator and tumbler lock.
 - 1. Nominal Dimensions: 11 inches wide x 14 inches high x 4 inches deep.
 - 2. Capacity: 400 C-fold or 525 multi-fold minimum.
 - 3. Product: B-262, Bobrick Washroom Equipment, Inc.
- C. Waste Receptacle: Owner-furnished, Owner-installed; refer to Section 01 6400 - Owner-Furnished Products.
- D. Soap Dispenser: Owner-furnished, Contractor-installed; refer to Section 01 6400 - Owner-Furnished Products.
- E. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
 - 1. Size: 24 inches wide by 36 inches high.
 - 2. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; bright polished finish.
 - 3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
 - 4. Product: B-165 2436, Bobrick Washroom Equipment, Inc.
- F. Grab Bars: Stainless steel, 1-1/2 inches outside diameter, minimum 0.05 inch wall thickness, nonslip grasping surface finish, concealed flange mounting; 1-1/2 inches clearance between wall and inside of grab bar.
- G.
 - 1. Grab Bar Type A:
 - a. Length: 42 inches.
 - b. Product: B-6806 x 42, Bobrick Washroom Equipment, Inc.
 - 2. Grab Bar Type B:
 - a. Length: 36 inches.
 - 3. Grab Bar Type C:
 - a. Length: 18 inches.
 - b. Product: B-6806 x 18, Bobrick Washroom Equipment, Inc.
 - 4. Grab Bar Type F:
 - a. Length: L-shaped, 18 by 30 inches.
 - b. Product: B-6861, Bobrick Washroom Equipment, Inc.
- H. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
 - 1. Product: B-254 manufactured by Bobrick with 353-12 disposable liners.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.
- D. See Section 06 1000 for installation of blocking in walls.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.
- C. Existing walls receiving recessed toilet accessories: Remove substrate as required to mount accessories in accordance with manufacturer's requirements. Remove elements and patch walls and finishes in accordance with Section 01 7000 - Execution and Closeout Requirements.

3.3 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As indicated; if not indicated provide the following:
 - 1. Toilet paper holders: Centered 15 inches from wall behind watercloset, 24 inches above finish floor.
- D. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

3.4 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Clean toilet accessories in accordance with manufacturer's written instructions after final adjustments have been made.
- C. Clean adjacent surfaces soiled by toilet accessory installation.

3.5 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals for additional submittals.

3.6 PROTECTION

- A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 4400
FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.2 REFERENCE STANDARDS

- A. FM (AG) - FM Approval Guide; current edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2017, with Errata (2018).
- C. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, anchorage details, and installation instructions.
- C. Shop Drawings: Indicate cabinet physical dimensions and rough-in measurements for recessed cabinets.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Activar Construction Products Group: www.activarcpg.com/#sle.
 - 2. Amerex Corporation: www.amerex-fire.com.
 - 3. Ansul, a Tyco Business: www.ansul.com.
 - 4. Buckeye Fire Equipment: Buckeyfire.com.
 - 5. Kidde, a unit of United Technologies Corp: www.kidde.com.
 - 6. Larsen's Manufacturing Co: www.larsensmfg.com
 - 7. Nystrom, Inc: www.nystrom.com.
 - 8. Potter-Roemer: www.potterroemer.com/#sle.
 - 9. Pyro-Chem, a Tyco Business: www.pyrochem.com.
 - 10. Substitutions: See Section 01 6000 - Product Requirements.

- B. Cabinets:
 - 1. Activar Construction Products Group: www.activarecp.com/#sle.
 - 2. Larsen's Manufacturing Co: www.larsensmfg.com
 - 3. Nystrom, Inc: www.nystrom.com.
 - 4. Potter-Roemer: www.potterroemer.com.

C. Substitutions: Not permitted.

2.2 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
 - 2. Provide one fire extinguisher for each cabinet location.
 - 3. Provide extinguishers which are fully charged and ready for operation upon installation.
 - 4. Provide extinguishers complete with Manufacturer's Warranty with Inspection Tag attached.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, hose discharge, with pressure gage.
 - 1. Class: A:B:C.
 - 2. U.L. Rating: 4A-80B:C.
 - 3. Size: 10 pound.
 - 4. Cylinder Diameter: 5 inches.
 - 5. Overall Height: 20 inches (nominal).
 - 6. Weight: 18 pounds (nominal).
 - 7. Finish: Baked polyester powder coat, red color.
 - 8. Locations: See Schedule at the end of this Section.
- C. Wet Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gage.
 - 1. Class K.
 - 2. Capacity: 2.5 gallons.
 - 3. Overall Width: 9 inches (nominal).
 - 4. Overall Height: 24 inches (nominal).
 - 5. Locations: See schedule at the end of this Section.
 - 6. Finish: No. 4.

2.3 FIRE EXTINGUISHER CABINETS

- A. Cabinet Construction: Non-fire rated.
 - 1. Formed stainless steel sheet; 0.036 inch thick base metal.
- B. Cabinet Configuration: Semi-recessed, ADA-compliant type.
- C. Sized to accommodate fire extinguisher.
 - 1. Exterior nominal dimensions of 13 inch wide by 27-1/2 inch high by 6 inch deep.
 - 2. Projected Trim: Returned to wall surface, with 4 inch projection, 1 3/4 inch wide face.
- D. Door: 1/2 inch thick, hollow steel door construction with tubular stiles and rails and vertical glazed opening. Hinge doors for 180 degree opening with continuous piano hinge; with self-adjusting roller catch.
 - 1. Door Handle: Manufacturer's standard fully recessed, ADA-compliant zinc alloy pull handle.

- E. Door Glazing: Acrylic plastic, clear, flat, narrow, vertical panel.
- F. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- G. Fabrication: Weld, fill, and grind components smooth.
- H. Finish of Cabinet Exterior Trim and Door: No. 4 - Brushed stainless steel.
- I. Locations: See Schedule at the end of this Section.
- J. Product, Non-Fire Rated Wall Locations:
 - 1. Architectural Series, Vertical Duo, SS-2409-RA, Larsen's Manufacturing Co.

2.4 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.
 - 1. Provide brackets for extinguishers not located in cabinets.
- B. Fasteners for masonry and concrete: Threaded stud bolt type expansion anchors with a single piece wedge, designed for concrete and masonry substrate; corrosion-resistant; shiny finish.
- C. Fasteners for Wood Substrate: Corrosion resistant, wood screws with pan head or round head; shiny finish.
- D. Fasteners for Metal Substrate: Self-drilling screws with pan head or round head; shiny finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Fire Extinguisher Cabinets:
 - 1. Install cabinets plumb and level in wall openings, 48 inches from finished floor to center of fire extinguisher handle.
- C. Brackets for wall-mounted fire extinguishers: Install brackets plumb and level, 48 inches from finished floor to top of bracket.
- D. Secure rigidly in place.
- E. Place extinguishers in cabinets and on wall brackets.

3.3 CLEANING

- A. Clean all surfaces of the work, and adjacent surfaces which are soiled as a result of the work.

3.4 SCHEDULES

- A. Fire Extinguisher Cabinets: Provide with Multipurpose Dry Chemical Type Fire Extinguishers.
 - 1. Locations : As indicated on Drawings.

- B. Surface Mounted Fire Extinguishers: Provide at locations indicated on the Drawings, with the following types of fire extinguishers:
1. Kitchen 122: Provide Wet Chemical Type fire extinguishers.
 2. Other locations as indicated on the Drawings: Provide Multipurpose Dry Chemical Type fire extinguishers.

END OF SECTION

SECTION 11 4000
FOODSERVICE EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Foodservice equipment.
- B. Connections to utilities.

1.2 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2022a.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- F. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- G. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of standard products of the type specified.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store products clear of floor in a manner to prevent damage.
- B. Coordinate size of access and route to place of installation.

1.5 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work of this section within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for replacement or repair of scheduled equipment, refrigerant and compressors, including disconnection and removal of defective unit, and connection of replacement unit.

PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Equipment Schedule: Refer to schedule at end of this section.
- B. Installation Accessories: Provide rough-in hardware, supports and connections, attachment devices, closure trim, and accessories as required for complete installation.

2.2 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating.
- B. Zinc-Coated Steel Shapes: ASTM A36/A36M, zinc-coated according to ASTM A123/A123M requirements.
- C. Stainless Steel Sheet: ASTM A666 Type 304 commercial grade, No. 4 finish.
- D. Stainless Steel: Type 302 extra low carbon, non-magnetic, Austenitic 18 percent chrome, 8 percent nickel containing 8 percent nickel corrosion resistant alloy steel (ASTM A240/A240M).
- E. Stainless-Steel Plate, and Flat Bar: ASTM A666, Type 304, stretcher leveled.
- F. Plastic Laminate: Complying with NEMA LD 3 and NSF 35 requirements; NSF certified for end-use application indicated; 0.050 inch (1.27mm) thick for horizontal and vertical surfaces and 0.042 inch (1.07mm) thick for post-formed surfaces; smooth texture; and easily cleanable.
- G. Glass: ASTM C1036 annealed, and laminated, 4 mm thick; exposed edges ground; cut or drilled to receive hardware.
- H. Sound Dampening: NSF-certified, nonabsorbent, hard drying, sound-deadening coating. Provide coating compounded for permanent adhesions to metal in 1/8-inch thickness that does not chip, flake, or blister.
- I. Gaskets: NSF certified for end-use application indicated, of resilient rubber, neoprene, or PVC that is nontoxic, stable, odorless, nonabsorbent, and unaffected by exposure to foods and cleaning compounds.
- J. Finish Hardware: Manufacturer's standard.
- K. Sealant: ASTM C 920; Type S, Grade NS, Class 25, Use NT. Provide electrometric sealant NSF certified for end-use application indicated. Provide sealant that, when cured and washed, meets requirements of Food and Drug Administration's 21 CFR, Section 177.2600 for use in areas that come in contact with food.

2.3 FABRICATION

- A. Fabricate food service equipment according to NSF 2 requirements. Fabricate equipment to greatest extent possible.
- B. Welding: Heliarc method; Use welding rod of same composition as metal being welded. Use methods that minimize distortion and develop strength and corrosion resistance of base metal. Provide ductile welds free of mechanical imperfections such as gas holes, pits, or cracks.
 - 1. Welded Butt Joints: Provide full-penetration welds for full-joint length. Make joints flat, continuous, and homogenous with sheet metal without relying on straps under seams, filling in with solder, or spot welding.
 - 2. Grind exposed welded joints flush with adjoining material and polish to match adjoining surfaces.

3. Where fasteners are welded to underside of equipment, finish reverse side of weld smooth and undeformed.
 4. Coat unexposed stainless-steel welded joints with suitable metallic-based paint to prevent corrosion.
 5. After zinc-coated steel is welded, clean welds and abraded areas and apply SSPC-Paint 20, high-zinc-dust-content, galvanizing repair paint to comply with ASTM A780/A780M.
- C. Fabricate field-assembled equipment prepared for field-joining methods indicated. For metal butt joints, comply with referenced SMACNA standard, unless otherwise indicated.
- D. Where stainless steel is joined to a dissimilar metal, use stainless steel welding material or fastening devices.
- E. Form metal with break bends that are not flaky, scaly, or cracked in appearance; where breaks mar uniform surface appearance of material, remove marks by grinding, polishing, and finishing.
- F. Stainless Steel Edge Types:
1. Rolled Edge: Formed by the top being rolled down 180 degrees on a 1-1/2 inch
 2. diameter.
 3. Bullnose Edge: Formed by the top being rolled down 120 degrees on a 1-3/4 inch
 4. diameter.
 5. Flat Edge: Formed by turning down the edge of the top 1-1/2 inches and then
 6. back 1/2 inch at 30 degree angle.
 7. Inverted "V" Edge (Marine Edge): Formed by raising the edge of the top
 8. 1/2 inch high on a 45 degree angle, then turning down 1-1/2 inches and back 1/2 inch at 30 degree angle.
 9. Raised Curb or Raised Rolled Edge: Formed by the top being turned up 3 inches
 10. high and rolled in a 1-1/2 inches diameter to form a 190 degree closure with corners fully ground. All horizontal and vertical corners to be fully coved.
- G. Install nylon button feet on bearing surface of any item positioned on a finished surface.
- H. Provide indirect drain piping from equipment to terminate over nearest waste receptor.

2.4 FINISHES

- A. Components: Shop finish.
- B. Metal (Except Stainless Steel): Degrease and phosphate etch, prime and apply minimum two coats factory baked epoxy, color as selected.
- C. Stainless Steel: No. 4 finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify ventilation outlets, service connections, and supports are correct and in required location.
- B. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install items in accordance with manufacturers' instructions.
- B. Insulate to prevent electrolysis between dissimilar metals.

- C. Weld and grind joints in steel work tight, without open seams, where necessary due to limitations of sheet sizes or installation requirements.
- D. Sequence installation and erection to ensure correct mechanical and electrical utility connections are achieved.
- E. Use anchoring devices appropriate for equipment and expected usage.

3.3 EXISTING EQUIPMENT

- A. Obtain, move, store, and re-install equipment, ready for utility connection.
- B. Do work in cooperation with Owner so that normal function of services is minimally interrupted.
- C. Re-used Equipment: Refer to schedule on drawings for re-used equipment.

3.4 CLOSEOUT ACTIVITIES

- A. At completion of work, provide qualified and trained personnel to demonstrate operation of each item of equipment and instruct Owner in operating procedures and maintenance.
 - 1. Test equipment prior to demonstration.
 - 2. Individual Performing Demonstration: Fully knowledgeable of all operating and service aspects of equipment.

3.5 PROTECTION

- A. Remove protective coverings from prefinished work.

3.6 FOODSERVICE EQUIPMENT SCHEDULE

- A. Walk-In Coolers and Freezer:
 - 1. Stainless-Steel Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304, stretcher leveled.
 - 2. Controls: Provide control switch or starter on each motor driven appliance or heating element in accordance with UL (DIR) listed product requirements.
 - 3. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.

END OF SECTION

SECTION 12 3600 COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Countertops for architectural cabinet work.

1.2 REFERENCE STANDARDS

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. PS 1 - Structural Plywood; 2009 (Revised 2019).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate countertop fabrication and installation with coiling counter doors.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
 - 4. Include data for countertop material.
- C. Shop Drawings: Complete details of materials and installation.
 - 1. Indicate materials, component profiles and elevations, assembly methods, hardware location and schedule of finishes.
 - a. Identify joint locations of horizontal panels used for countertops.
 - b. Identify side splashes, back splashes, and end splashes.

1.5 QUALITY ASSURANCE

- A. Fabricator and Installer: Same company used for casework specified in Section 06 4100 - Architectural Wood Casework.
- B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
 - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
 - 2. Single Source Responsibility: Provide and install this work from single fabricator.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

D. Quality Certification:

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.1 COUNTERTOPS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B. Stainless Steel Countertops: Type 304, stainless steel sheet; 16 gauge, 0.0625 inch nominal sheet thickness.
 - 1. Manufacturers:
 - 2. Finish: 4B satin brushed finish.
 - 3. Exposed Edge Shape: Bullnose with return; 3/4 inch radius, return to face of case.
 - 4. Side Edge: Closed, same material, matching exposed edge shape, fully welded.
 - 5. Back and End Splashes: Same material; welded 1/4 inch radius coved joint to countertop; square top edge with 1 inch wide top surface and minimum 1/2 inch turndown.
 - a. Exposed Sides: Closed, same material, matching splash profile, fully welded.
 - 6. Splash Dimensions: 4 inch high by 1 inch thick, unless otherwise indicated.

2.2 MATERIALS

- A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- C. Joint Sealant: As specified in Section 07 9200 - Joint Sealants.
- D. Clips, Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel finish in exposed locations.
- E. Concealed Joint Fasteners: Threaded steel.

2.3 FABRICATION

- A. Stainless Steel: Fabricate tops up to 144 inches long in one piece including nosings, sides, and back and end splashes; accurately fitted mechanical field joints in lengths over that dimension are permitted.
 - 1. Weld joints; grind smooth and polish to match.

- a. Welding: Perform welding by Heliarc method; where filler rods are used, use same grade composition as materials to be joined and contain a flux to minimize carbide precipitation.
- b. Unexposed welds: Pacified and suitably coated to prevent corrosion.
- c. Soldering as a replacement for welding is unacceptable.
- 2. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- 3. Terminate exposed edges with concealed hems.
- 4. Provide wall clips for support of back/end splash turndowns.
- 5. Pressure-glue stainless steel over two layers softwood plywood.
- B. Provide cutouts for plumbing fixtures and fixtures and fittings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Securely attach countertops using concealed fasteners. Make flat surfaces level; shim where required.
- B. Attach stainless steel countertops using stainless steel fasteners and clips.
- C. Service Locations: Cut and drill countertops, backs, and other components for fixtures and service outlets.
- D. Seal joints between countertops and adjacent surfaces.
- E. Seal joint between back/end splashes and vertical surfaces.

3.4 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.

3.5 CLEANING

- A. Clean countertops surfaces thoroughly.

3.6 PROTECTION

- A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.
END OF SECTION

SECTION 13 3419
METAL BUILDING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Manufacturer-engineered, shop-fabricated structural steel building frame.
- B. Metal wall and roof panels including gutters and downspouts.
- C. Exterior doors and overhead doors.

1.2 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 07 9200 - Joint Sealants: Sealing joints between accessory components and wall system.
- C. Section 07 2100 - Blanket Insulation at Exterior Walls.
- D. Section 07 4113 - Metal Roof Panels: Preformed roof and soffit panels.
- E. Section 07 4213 - Metal Wall Panels: Preformed wall panels.
- F. Section 07 7123 - Manufactured Gutters and Downspouts: Preformed, prefinished gutters and downspouts.
- G. Section 08 1113 - Hollow Metal Doors and Frames.
- H. Section 08 3323 - Overhead Coiling Doors.
- I. Section 08 4500 - Translucent Wall and Roof Assemblies.

1.3 REFERENCE STANDARDS

- A. AISC 360 - Specification for Structural Steel Buildings; 2016.
- B. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2018).
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021.
- F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- G. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2014.
- H. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2017.
- I. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).

- J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- L. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2018.
- M. MBMA - Metal Roofing Systems Design Manual; 2012.
- N. MBMA (MBSM) - Metal Building Systems Manual; 2012.
- O. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with Errata (2015).

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Provide permit drawings for pre-engineered metal building in accordance with requirements of authorities having jurisdiction, sealed by a licensed Engineer registered in State where the project is located.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Manufacturer's Letter of Certification: Provide document from pre-engineered building manufacturer that certifies the building components are designed in accordance with:
 - 1. Structural Steel: AISC 360.
 - 2. Bolted Connections: RCSC (HSBOLT).
 - 3. Cold-Formed Steel: AISI S100.
 - 4. County Climatic Data: MBMA Metal Building Systems Manual.
 - 5. Governing Design Code: Include name and edition (year) of applicable code.
 - a. Include values for each of the following loads, in accordance with the governing design code:
 - 1) Roof snow load in pounds per square foot - ground snow load not acceptable without exposure coefficient shown.
 - (a) Certify that the building system is designed for a drift snow load applied in accordance with the Low Rise Building Systems Manual which meets or exceeds the governing code; Certify that load combinations are in accordance with the governing code; Identify concentrated load and snow load values.
 - 2) Wind Speed in miles per hour - include wind exposure in accordance with governing design code.
 - 3) Seismic Zone: Provide in accordance with governing design code designation.
 - 4) Collateral Load: Provide in accordance with required design requirements.
 - 5) Importance Factor: Include importance factor for the building's intended use, in accordance with governing design code designation.
- C. Product Data: Provide data on profiles, component dimensions, fasteners.
 - 1. Include product data for the following products specified in other sections:
 - a. Metal Roof Panels as specified in Section 07 4113 - Metal Roof Panels.
 - b. Metal Wall Panels as specified in Section 07 4213 - Metal Wall Panels.
 - c. Gutters and Downspouts as specified in Section 07 4113 - Metal Roof Panels.
- D. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchors and methods of anchorage, and installation; framing anchor bolt settings, sizes, locations from datum, and

foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

1. Tabulate and indicate on shop drawings all resultant forces of building on all anchor points. Table shall be clear and concise and shall list loads separately for dead loads, live loads, wind loads, and seismic loads in both horizontal and vertical directions. Indicate codes and load factors used to calculate forces. Indicate any construction load requirements.
 2. Indicate details and locations of metal bracing required to support framing members that support piping, conduit, fixtures, and equipment.
- E. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement.
- F. Pre-Engineered Building Erector Qualifications: Submit certification that erector has been erecting the Products specified in this Section for the period of time indicated in the Quality Assurance article below.
- G. Pre-Engineered Building Manufacturer Qualifications: Submit certification that manufacturer has been manufacturing the Products specified in this Section for the period of time indicated in Quality Assurance article.
- H. Metal Building Manufacturers Association (MBMA) Membership: Submit certification that manufacturer has been listed as a member of the MBMA for at least three years from the Bid Date for this project.
- I. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.

1.6 QUALITY ASSURANCE

- A. Metal Building System: Provided by a single source, including primary and secondary framing, wall panels, roof panels, trim, and accessories, which are manufactured to permit inspection on-site prior to assembly or erection.
- B. Designer Qualifications: Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this type of work.
1. Design Engineer Qualifications: Licensed in the State in which the Project is located.
 2. Comply with applicable code for submission of design calculations as required for acquiring permits.
 3. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.
 4. Perform work in accordance with AISC 360 and MBMA (MBSM).
- C. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
1. Not less than five years of documented experience
 2. Accredited by IAS in accordance with IAS AC472.
 3. Listed member of the Metal Building Manufacturers Association (MBMA) for at least five years.
- D. Erector Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and at least 5 years experience in the erection of metal buildings of the size and complexity shown and provided by the selected manufacturer.

- E. Provide metal building members designed and detailed by metal building manufacturer /supplier; design shall include, but not be limited to: columns and girts; roof beams and purlins; column base plates; bracing and miscellaneous framing related to roof and wall openings.
- F. Submit shop drawings, calculations, and other documents as necessary to the local authorities having jurisdiction in accordance with their requirements prior to construction.

1.7 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Buildings Systems:
 - 1. Butler Manufacturing Company; www.butlermfg.com.
 - 2. Ceco Building Systems: www.cecobuildings.com.
 - 3. VP Buildings: www.vp.com/#sle.
- B. Substitutions: Not permitted.

2.2 EVENT BARN ADDITION ASSEMBLY

- A. Lean-to.
 - 1. Column Profile: Straight, uniform depth.
- B. Bay Spacing: As indicated on the Drawings.
- C. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, braced frames, and end wall columns, and wind bracing.
 - 1. Endwall Columns: Manufacturer's standard shop-painted, built-up "I"-shape.
 - 2. Endwall Beams: Manufacturer's standard shop-painted, built-up "I"-shape.
 - 3. Braced frames: Locate as required to avoid wall openings and wall-mounted equipment and wall penetrations; braced frames are not allowed at walls abutting areas indicated for future expansion.
- D. Secondary Framing: Purlins, Girts, Eave struts, Flange bracing, Sill supports, Clips, and Channels, Cees, Zees, Headers, Jambs, and other items detailed.
 - 1. Wall girt connections at columns: Bypass design, interior face of girt set flush with exterior face of wall columns.
 - 2. Provide additional secondary framing members as required to support wall openings, roof penetrations, wall and roof-mounted equipment, and other equipment and furnishings indicated.
- E. Roof Slope: As indicated.

2.3 MULTI-PURPOSE EVENT FACILITY ASSE

- A. Single Span Rigid Frame.
 - 1. Column Profile: Tapered.
- B. Bay Spacing: As indicated on the Drawings.

- C. Primary Framing: Rigid frame of rafter beams and columns, canopy beams, braced frames, and end wall columns, and wind bracing.
 - 1. Endwall Columns: Manufacturer's standard shop-painted, built-up "I"-shape.
 - 2. Endwall Beams: Manufacturer's standard shop-painted, built-up "I"-shape.
 - 3. Braced frames: Locate as required to avoid wall openings and wall-mounted equipment and wall penetrations; braced frames are not allowed at walls abutting areas indicated for future expansion.
- D. Secondary Framing: Purlins, Girts, Eave struts, Flange bracing, Sill supports, Clips, and [Channels, Ceers, Zees, Headers, Jambs], and other items detailed. Girts/Purlins: Provide sizes as required to meet minimum thermal resistance performance requirements identified in this Section.
 - 1. Wall girt connections at columns: Bypass design, interior face of girt set flush with exterior face of wall columns.
 - 2. Provide additional secondary framing members as required to support wall openings, roof penetrations, wall and roof-mounted equipment, and other equipment and furnishings indicated.
 - 3.
 - 4. Roof Slope: As indicated.

2.4 PERFORMANCE REQUIREMENTS

- A. Installed Thermal Resistance of Roof and Wall Systems: As specified in Drawings.
- B. Engineer, design, fabricate, and erect the pre-engineered building to withstand loads from winds, gravity, seismic, structural movement including movement thermally induced, and to resist in-service use conditions that the building will experience, including exposure to the weather, without failure; calculated in accordance with applicable code.
 - 1. Design Loads: As indicated on the Drawings.
- C. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of -50 to 150 degrees F.

2.5 MATERIALS - FRAMING

- A. Structural Steel Members: ASTM A36/A36M.
- B. Structural Tubing: ASTM A500/A500M Grade B cold-formed.
- C. Plate or Bar Stock: ASTM A529/A529M, Grade 50.
- D. Anchor Bolts: ASTM A307, Grade A, with no preference for protective coatings.
- E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1; galvanized to ASTM A153/A153M.
- F. Welding Materials: Perform in accordance with AWS D1.1/D1.1M.
- G. Primer: SSPC-Paint 20.
- H. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
 - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

2.6 MATERIALS - WALLS AND ROOF

- A. Metal Roof Panels: As specified in Section 07 4113 - Metal Roof Panels.
- B. Metal Wall Panels: As specified in Section 07 4213 - Metal Wall Panels.

2.7 ACCESSORIES

- A. Joint Seal Gaskets: Manufacturer's standard type.
- B. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.
- C. Bituminous Paint: Asphaltic type.
- D. Sealant: As specified in Section 07 9200 - Joint Sealants.
- E. Manufactured pipe flashings: As specified in Section 07 7200 - Roof Accessories.

2.8 COMPONENTS

- A. Gutters and Downspouts: Specified in Section 07 7123 - Manufactured Gutters and Downspouts.
- B. Steel Doors and Frames: Specified in Section 08 1113.
- C. Hardware: Specified in Section 08 7100.
- D. Overhead Coiling Doors: Specified in Section 08 3323.
- E. Translucent Wall Assemblies: Specified in Section 08 4500 - Translucent Wall and Roof Assemblies.
- F. Windows: Specified in Section 08 5659.

2.9 FABRICATION - FRAMING

- A. Fabricate members in accordance with AISC 360 for plate, bar, tube, or rolled structural shapes.
 - 1. Base Plates: Manufacturer's standard steel plates, factory welded to columns, in strength, sizes and configurations as required to meet loading requirements.
- B. Secondary Framing: Manufacturer's standard rolled formed steel shapes to receive siding, roofing panels.
 - 1. Provide additional girts, purlins, channels, clips, struts, and supplemental framing as required to support wall and roof penetrations, accessories, and other roof and wall mounted equipment and furnishings.
- C. Anchor Bolts: Formed with bent shank, assembled with template for casting into concrete.
- D. Provide metal bracing as required to support framing members that support piping, conduit, fixtures, and equipment.
- E. Provide framing for roof and wall openings.
- F. Provide wall opening framing for doors, windows, and other accessory components.

2.10 FABRICATION - GUTTERS AND DOWNSPOUTS

- A. Gutters and Downspouts: As specified in Section 07 7123 - Manufactured Gutters and Downspouts.

2.11 FINISHES

- A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.
- B. Exposed primary and secondary framing members including but not limited to, beams, columns, girts, purlins, structural components, and framing: Field paint in accordance with Section 09 9000 - Painting and Coating.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

3.2 ERECTION - FRAMING

- A. Erect framing in accordance with AISC 360.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval.
- E. After erection, prime welds, abrasions, and surfaces not shop primed.

3.3 ERECTION - WALL AND ROOF PANELS

- A. Metal Roof and Soffit Panels: As specified in Section 07 4113 - Metal Roof Panels.
- B. Metal Liner Panels: As specified in Section 07 4213 - Metal Wall Panels.

3.4 INSTALLATION - ACCESSORY COMPONENTS

- A. Install accessories in accordance with manufacturer's instructions.

3.5 TOLERANCES

- A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
- B. Siding and Roofing: 1/8 inch from true position.

END OF SECTION

SECTION 22 0010
PLUMBING GENERAL PROVISIONS

PART 1 GENERAL

1.1 PROVISIONS:

- A. The Plumbing Specifications are subject to all the requirements of the General Conditions of the Contract and Specifications and shall be used in conjunction therewith. The Plumbing Contractor shall refer to other divisions of the Drawings and Specifications for work which must be carried on in conjunction with the Plumbing work so that the construction operations can proceed without harm to the Owner for interference, delay or absence of coordination.

1.2 DRAWINGS AND SPECIFICATION COORDINATION:

- A. Drawings and specification indicate the extent and general arrangement of the Equipment and systems, and intend to provide the Owner with complete, functioning systems under this Contract.
- B. Should conditions necessitate a rearrangement of piping, ductwork, equipment, etc., such departures and the reasons, therefore shall be submitted to the Architect by the Contractor for approval, in the form of detailed drawings showing the proposed changes. No such changes shall be made without the prior written approval of the Engineer. Equipment and piping arrangements shall provide adequate and acceptable clearance for entry, servicing and maintenance.
- C. Drawings and Specifications shall be considered as cooperative, and work or materials called for by one and not mentioned in the other shall be done and furnished as though treated by both.
- D. In the case of insufficient information and discrepancies in figures, dimensions, details, Drawings, Specifications, or construction notes, the Architect shall be notified immediately and his decision shall determine the necessary adjustment. Without such decision, said discrepancies shall not be adjusted by the Contractor. In case of any settlement or any complication arising from such adjustment to the Contractor, he shall bear all extra expense involved. There shall be no additional expense to the Owner, Architect or Engineer.
- E. Should it appear that the work intended to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the drawings or specifications, the Contractor shall apply to the Architect for such further drawings or explanations as may be necessary, allowing a reasonable time for the Architect to supply same, and the Contractor shall conform to same as part of the Contract.
- F. Should any doubt or question arise in respect to the true meaning of the Drawings or Specifications, reference shall be made to the Architect whose decision shall be final and conclusive.
- G. All piping and all ducts in the finished areas of the building shall be run concealed in chases, furrings, suspended ceilings, etc., unless noted or directed otherwise. Should

any condition arise which would cause any piping or duct to be exposed in finished areas, it shall immediately be called to the Architect's attention and this Contractor shall bear any and all expense in connection with rearranging his work as directed to facilitate its concealment. In unfinished spaces such as ceiling spaces and equipment rooms, all pipe lines shall be run to a continuous grade and square to the building.

- H. Plumbing Contractor shall thoroughly acquaint himself with the details of the Drawings and Specifications before submitting his bid as no allowance will be made because of unfamiliarity with these details. Place all inserts required for concrete construction in place in the forms before concrete is poured and in masonry walls while they are under construction. All concealed piping and ducts shall be installed prior to the time the chases and furrings are fabricated.
- I. The Drawings do not give exact details as to elevations of piping, exact locations, etc., and do not show all offsets, control lines, pilot lines and their installation details. The Contractor shall carefully lay out his work at the site to conform to the structural conditions, provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide an integrated, satisfactory operation installation.
- J. Should the particular equipment which any Contractor proposes to install, require other space conditions than those indicated on the drawings, the Contractor shall arrange for such space with the Architect before submitting his bid. Should changes become necessary on account of failure to comply with these details, the Contractor shall make such necessary changes at his (the Contractor's) own expense.
- K. Plumbing Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans which shall be checked by the Architect and approved before the work is started. Interference with the structural conditions shall be corrected before work proceeds.
- L. All equipment shall be installed in accordance with the manufacturer's recommendations. Provide all accessories and components for optimum operation as recommended by the manufacturer.

1.3 FIELD MEASUREMENTS:

- A. Prior to the start of fabrication and/or installation the Contractor shall verify all dimensions, clearances and field conditions governing the plumbing work.
- B. No extra compensation shall be claimed or allowed on account of difference between actual dimensions and those indicated on the drawings.
- C. The Contractor shall examine adjoining work on which plumbing, heating ventilating and air conditioning is dependent for perfect efficiency and shall report any work that must be corrected.
- D. No waiver of responsibility for defective work shall be claimed or allowed due to failure to report unfavorable conditions affecting the plumbing work.

1.4 SHOP DRAWINGS:

- A. Shop drawings shall be submitted indicating complete equipment and material data.

- B. Shop drawings or fully descriptive catalog data shall be submitted by the Contractor for all items of material and equipment furnished and installed under this Contract. The Contractor shall submit to the Architect a sufficient number of copies of all such shop drawings or catalog data to provide him with as many review copies as he may need; plus three (3) copies for retention by the Architect. No materials or equipment shall be installed until officially approved by the Architect. The Contractor shall submit to the engineer, data on equipment substitutions a minimum of 10 days prior to the bid date for approval by the Engineer.
- C. The review of Shop Drawings or catalog data by the Architect shall not relieve the Plumbing Contractor from responsibility for deviations from the Drawings and Specifications unless he has, in writing, specifically called attention to such deviations at the time of submission and has obtained the permission of the Architect thereon; nor shall it relieve him from the responsibility for error of any kind in shop drawings. When the Contractor does call such deviations to the attention of the Architect, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.
- D. Shop drawings will be returned unchecked unless the following information is included: reference to all pertinent data in the Specifications or on the drawings, symbol designation of equipment as indicated on drawing, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings.
- E. Additional fees will be charged for reviewing second submittal and shop drawings on equipment, fixtures and system, etc. that had been approved on the first submittal review. Additional fees will be also charged for reviewing submittals and shop drawings on equipment, fixtures and system, etc. that had been reviewed and the contractor/supplier failed to incorporate all of the engineers requirements and requests. The fees will be on a time-and-material basis at current hourly rates. The additional fees will be at the Plumbing Contractor expense with no expense to the owner.
- F. After receiving approval on the make and type of materials, the contractor shall order such materials in sufficient time so that no delay or changes will be caused. This is done to facilitate progress on the job and failure on the part of the contractor shall render him liable to stand the expense of any and all delays occasioned by failure on his part to provide necessary details. All shop drawings shall be delivered to the Architect's office within (30) days from the date of the contract.

1.5 CODES AND STANDARDS:

- A. All work shall be performed in strict accordance with the applicable provisions of the Uniform Plumbing Code and Gas Ordinance of the State of New Mexico, the Uniform Mechanical Code, the International Building Code, the Life Safety Code, and any other applicable codes and ordinances.
- B. Where the Contract Documents indicate materials or construction in excess of Code requirements, the Drawings of Specifications shall govern.
- C. The Owner and the Architect shall be held free and harmless from liability of any kind or nature arising from his failure to comply with codes and ordinances.

- D. The Plumbing Contractor shall include in his bid to apply for and pay for all permits and certificates of inspection including connections, meter setup fees or extension/expansion of all utility lines.
- E. Appropriate standards, such as ASA or ASTM or other established standards, shall become part of the Contract Documents to the extent they are referred to herein.

1.6 ELECTRICAL SERVICES:

- A. Motor starters, control equipment and wirings indicated on the electrical drawings, except items otherwise specifically noted, will be furnished and installed by the Electrical Contractor.
- B. All equipment and controls shall be coordinated with Division 16, Electrical, to insure that all required components are furnished and properly installed. No additional expense will be allowed due to lack of coordination.
- C. The Plumbing Contractor must refer to the electrical control equipment and wiring shown on the Electrical Drawings. Any changes or additions required by specified equipment furnished shall be the complete responsibility of the Plumbing Contractor furnishing the equipment.
- D. All electrical equipment characteristics (voltage, etc.) must be verified by the Architect prior to ordering.
- E. All motors shall be built in accordance with the current applicable IEEE, ASA, and NEMA standards. All general purpose motors shall be open drip-proof machines for installation indoors and/or in protected locations. Totally enclosed fan cooled (TEFC) motors shall be used in all areas of exposure to weather or other environmental contamination. Motors shall be rated explosion proof when location is in hazardous atmospheres. Type II weather protected motors may be used in lieu of TEFC motors on cooling towers, roof fan units, and similar equipment. Motors mounted in direct sun shall be provided with a shield to prevent direct radiation from the sun when the sun is 45 degrees or greater above the horizon. All motors shall have copper windings. All motors to have minimum power factor of 85% or have switched correction to 90%. Starters shall meet all requirements furnished by the Plumbing Contractor.
- F. Unless indicated otherwise, motors shall be NEMA Design B with a service factor of 1.15 with 40 degrees centigrade rise and total temperature rise of 65 degrees centigrade ambient and when powered from the system voltage feeding the motor. TEFC motors shall have a service factor of 1.00 with total temperature rise of 65 degrees centigrade in the above conditions. Motors located in areas exceeding 40 degrees centigrade ambient shall be factory-rated for the ambient temperature of the motor environment. Single phase motors shall generally be NEMA Type N split phase induction motors with built-in thermal protectors. Single phase motors connected on loads requiring high starting torque shall be capacitor-start induction motors. Single phase motors of 1/10 HP or less may be shaded pole induction motors.
- G. If the contractor proposes to furnish motors varying in horsepower and/or characteristics from those specified, he shall first inform the Architect of the change

and shall then coordinate the change with the Electrical Contractor and shall pay all additional charges in connection with the change.

1.7 ALTITUDE RATINGS:

- A. Unless otherwise noted, all specified equipment capacities, air quantities, etc., are for site elevation above sea level, and adjustments to the manufacturer's ratings must be made accordingly.

1.8 FLUSHING AND DRAINING:

- A. Properly drain and flush all ducts and pipes before use of acceptance to insure that all debris is completely removed. Damage caused by such debris remaining in the ducts or pipes shall be repaired by the Plumbing Contractor at his expense. This Contractor shall demonstrate to the Architect's representative that all piping is clean.

1.9 CLEANING:

- A. Remove from the building construction site all rubbish and dirt as it accumulates. At completion, all areas shall be broom cleaned and all obstructions, surplus materials, etc., removed. All disposable filters in air handling units shall be replaced and all permanent filters shall be cleaned.

1.10 UTILITIES:

- A. The location, size, and elevation of existing sewer lines and the location, size and pressure of existing water and gas lines are shown in accordance with data given this office by others. As Engineers, we cannot and do not guarantee the accuracy of this data. Each bidder shall check and verify this data. The points of connection to utility lines are approximate only and shall be verified by each bidder prior to submitting his bid.

1.11 SITE VISIT:

- A. Visit the site prior to bidding and verify the conditions under which the plumbing systems are to be installed. No subsequent allowance shall be made in his behalf for failure to make such a visit.

PART 2 MATERIALS

2.1 QUALITY:

- A. The materials and equipment shall be new and shall be the standard products of the manufacturers regularly engaged in the production of Plumbing, Heating, Cooling, Ventilating and Fire Protection Equipment, and shall be the manufacturer's latest standard design. Where two or more units of the same class of equipment are required, these units shall be the products of the same manufacturer. However, the component parts of the systems need not be the products of the same manufacturer. Specific equipment specified hereinafter is to be considered a standard of quality and operation. Should this Contractor desire and install equipment and materials other than that

specifically mentioned, he shall submit complete information and engineering data on same to the Architect. This Contractor shall obtain written approval before purchasing proposed substitute equipment. In general, all capacities of equipment, and motor and starter characteristics are shown in schedules on the drawings. Reference shall be made to the schedules for each information. The capacities shown are minimum capacities. Variations in the characteristics will be permitted only on written approval of the Architect. All equipment shall be shipped to the job with not less than a prime coat of paint or as specified hereinafter. Insofar as it is possible, all items of the same type (i.e., pumps, fans, etc.) shall be by the same manufacturer. Where installation instructions are not included in these specifications or on the plans, the manufacturer's instructions shall be followed. All equipment affected by altitude shall be rated to operate at the altitude where it is to be installed.

2.2 PROTECTION OF MATERIALS AND EQUIPMENT:

- A. Materials and equipment shall be protected at all times.
- B. The Plumbing Contractor shall make good all damage caused directly or indirectly by his workmen.
- C. Pipe and duct openings shall be closed with caps or plugs during installation. Prior to startup, check to see that all temporary covers have been removed.
- D. Equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury.
- E. At the completion of all work, the equipment shall be thoroughly cleaned and delivered in a condition satisfactory to the Owner.

PART 3 EXECUTION

3.1 EXCAVATING AND BACKFILLING:

- A. All excavating and backfilling shall be done by this Contractor except as noted on plans. Trenching shall be done as shown on the Drawings and according to the Plumbing Code.
 - 1. Curb cuts, asphalt, and concrete patching, etc., shall be part of this Contractor's responsibility. No extra payment will be made for rock excavation. Trenches for all underground piping shall be excavated to the required depths. The bottoms of trenches shall be tamped hard and graded to secure maximum fall. Bell holes shall be excavated to assure the pipe is resting for its entire length on solid ground. Should rock be encountered, it shall be excavated to a depth of 6" below the bottom of the pipe, and before laying the pipe, the space between the bottom of the pipe, and the rock surface shall be filled with gravel, thoroughly. Pipe laid in trenches dug in fill, shall be supported down to load bearing undisturbed soil. After the pipes have been tested and inspected, the trenches shall be filled. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. All surplus materials shall be hauled from the project by the Contractor at his expense.

- B. Backfilling shall be done in 6" layers to 18" above piping, tamping each layer to protect piping from damage.
- C. Backfilling shall be completed to 95% compaction under building and within 5 feet of the building line and 90% elsewhere.

3.2 STREET CUTS SHALL BE REPLACED IN KIND.

3.3 CUTTING AND REPAIRING:

- A. Responsibility of the Contractor whose work is involved is to coordinate with others to prevent unnecessary cutting and repairing. Lay out and locate equipment, openings, and chases. Install sleeves, inserts, and supports. Arrange with those whose work is involved to do cutting and replacing caused by negligence or error with costs reimbursed by the Contractor at fault. Cutting and replacing of the existing work shall be the responsibility of the Contractor whose work is being installed. Removal or terminating connections of existing work which is abandoned or replaced shall also be done hereunder to provide correct and finished work.

3.4 LUBRICATION:

- A. Provide all oil for the operation of all equipment until acceptance and provide a chart listing the type of oil to be used for each piece of equipment.
- B. Properly lubricate all bearings and shafts during the installation. This contractor shall be held responsible for all damage to bearings while the equipment is being operated by him up to the date of acceptance of the equipment.
- C. All motors and other equipment shall be provided with covers as required for protection during construction.

3.5 OPERATING AND MAINTENANCE INSTRUCTIONS:

- A. Operations and Maintenance Manuals shall be submitted as required by Division One and these Specifications.
- B. All Operating Manuals shall be given to the Architect.

3.6 GUARANTEE:

- A. All equipment, materials and workmanship to be furnished and performed under this Contract shall be guaranteed for a period of one (1) year, commencing from the written notice of substantial completion approved by the Architect.
- B. The Contractor shall, upon notification by the Owner, during that period correct any such defects without cost to the Owner.

3.7 FOUNDATION:

- A. All equipment shall be provided with suitable foundations and supports. It shall be the responsibility of this Contractor to provide for the proper locations of these foundations and supports. This applies to all rooftop equipment also. All concrete foundations required by equipment furnished by the Plumbing Contractor shall be constructed by them (except where otherwise noted) in conformance with the recommendations of the manufacturer of the respective equipment, and with the approval of the Architect. All

corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow 1" below the equipment base for alignment, leveling and grouting with nonshrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms, the surface of the foundation shall be rubbed. Unless otherwise noted, foundations shall be a minimum of 6" high. All concrete work performed by these contractors shall conform entirely to the requirements of the Concrete Specifications which describe this class of work.

3.8 FLASHING:

- A. The Contractor shall be responsible for providing and installing all counterflashing. All openings in the roof shall be flashed and counterflashed. Use 4-pound per square foot lead flashing materials for all vent lines and welded flashing in steel lines passing through roof. The Plumbing Contractor shall notify the General Contractor where each roof penetration is and the size of the opening.

3.9 ACCESS PANELS:

- A. Similar to Milcor, size as required for concealed expansion joints, valves, traps, balancing dampers, equipment, and similar items requiring accessibility. Notify the General Contractor of each access panel location and the required size. Panels shall be proper type for ceiling or wall in which they are installed. The panels shall be furnished under this section of the Specifications, but shall be coordinated to be compatible with walls and ceilings furnished under other sections.

END OF SECTION

SECTION 22 0517
SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe sleeves.
- B. Pipe sleeve-seals.

1.2 REFERENCE STANDARDS

- A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type); 2016.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.4 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 PIPE SLEEVES

- A. Plastic or Sheet Metal: Pipe passing through interior walls, partitions, and floors, unless steel or brass sleeves are specified below.
- B. Pipe Passing Through Below Grade Exterior Walls:
 - 1. Zinc coated or cast iron pipe.
 - 2. Provide watertight space with link rubber or modular seal between sleeve and pipe on both pipe ends.
- C. Pipe Passing Through Concrete Beam Flanges, except where Brass Pipe Sleeves are Specified:
 - 1. Galvanized steel pipe or black iron pipe with asphalt coating.
 - 2. Connect sleeve with floor plate except in mechanical rooms.
- D. Clearances:
 - 1. Provide allowance for insulated piping.
 - 2. Wall, Floor, Partitions, and Beam Flanges: 1 inch (25 mm) greater than external pipe diameter.

3. All Rated Openings: Caulked tight with fire stopping material complying with ASTM E814 in accordance with Section 07 8400 to prevent the spread of fire, smoke, and gases.

2.2 PIPE-SLEEVE SEALS

PART 3 EXECUTION

3.1 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- B. Install piping to conserve building space, to not interfere with use of space and other work.
- C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
- E. Manufactured Sleeve-Seal Systems:
 1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
 2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
 3. Locate piping in center of sleeve or penetration.
 4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
 5. Tighten bolting for a water-tight seal.
 6. Install in accordance with manufacturer's recommendations.
- F. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

END OF SECTION

SECTION 22 0529
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Prefabricated trapeze-framed systems.
- B. Strut systems for pipe or equipment support.
- C. Beam clamps.
- D. Pipe hangers.
- E. Pipe supports, guides, shields, and saddles.
- F. Nonpenetrating rooftop supports for low-slope roofs.
- G. Anchors and fasteners.

1.2 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General - Purpose Piping; 2014 (Reapproved 2020).
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2018).
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures; 1999 (Reapproved 2018).
- H. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- J. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- K. FM (AG) - FM Approval Guide; current edition.
- L. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.
- M. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

- N. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 3000.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.
- B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
- C. Installer's Qualifications: Include evidence of compliance with specified requirements.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.5 QUALITY ASSURANCE

- A. Comply with applicable building code.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Provide required hardware to hang or support piping, equipment, or fixtures with related accessories as necessary to complete installation of plumbing work.
- B. Provide hardware products listed, classified, and labeled as suitable for intended purpose.
- C. Materials for Metal Fabricated Supports: Comply with Section 05 5000.
 - 1. Zinc-Plated Steel: Electroplated in accordance with ASTM B633 unless stated otherwise.
 - 2. Galvanized Steel: Hot-dip galvanized in accordance with ASTM A123/A123M or ASTM A153/A153M unless stated otherwise.
- D. Corrosion Resistance: Use corrosion-resistant metal-based materials fully compatible with exposed piping materials and suitable for the environment where installed.

2.2 PREFABRICATED TRAPEZE-FRAMED SYSTEMS

- A. Prefabricated Trapeze-Framed Metal Strut Systems:
 - 1. Strut Channel or Bracket Material:
 - a. Indoor Dry Locations: Use zinc-plated steel or galvanized steel.
 - 2. Accessories: Provide bracket covers, cable basket clips, cable tray clips, clamps, conduit clamps, fire-retarding brackets, j-hooks, protectors, and vibration dampeners.

2.3 BEAM CLAMPS

- A. C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
- B. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).
- C. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
- D. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
- E. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish.
- F. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
- G. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.

2.4 PIPE HANGERS

- A. Clevis Hangers, Adjustable:
 - 1. Copper Tube: MSS SP-58 type 1, epoxy-plated copper.
 - 2. Light-Duty: MSS SP-58 type 1, zinc-colored, epoxy plated.
 - 3. Standard-Duty: MSS SP-58 type 1, zinc-colored, epoxy plated.

4. UL (DIR) listed: Pipe sizes 2-1/2 to 8 inch (65 to 200 mm, DN).
5. FM (AG) listed: Pipe sizes 2-1/2 to 8 inch (65 to 200 mm, DN).

2.5 PIPE CLAMPS

- A. Riser Clamps:
 1. For insulated pipe runs, provide two bolt-type clamps designed for installation under insulation.
 2. MSS SP-58 type 1 or 8, carbon steel or steel with epoxy plated, plain, stainless steel, or zinc plated finish.
 3. UL (DIR) listed: Pipe sizes 1/2 to 8 inch (15 to 200 mm, DN).

2.6 PIPE SUPPORTS, GUIDES, SHIELDS, AND SADDLES

- A. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.
- B. Pipe Supports:
 1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
 2. Liquid Temperatures Up to 122 degrees F (50 degrees C):
 - a. Overhead Support: MSS SP-58 types 1, 3 through 12 clamps.
 - b. Support From Below: MSS SP-58 types 35 through 38.
- C. Pipe Supports, Thermal Insulated:
 1. General Requirements:
 - a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
 - b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
 - c. Provide pipe supports for 1/2 to 30 inch (15 to 750 mm, DN) iron pipes.
 - d. Insulation inserts to consist of rigid phenolic foam insulation surrounded by 360 degree, PVC jacketing.
 2. PVC Jacket:
 - a. Pipe insulation protection shields to be provided with ball bearing hinge and locking seam.
 - b. Moisture Vapor Transmission: 0.0071 perm inch (0.0092 ng/Pa s m), when tested in accordance with ASTM E96/E96M.
 - c. Minimum Thickness: 60 mil, 0.06 inch (1.524 mm).
- D. Copper Pipe Supports:
- E. Overhead Pipe Supports:
 1. Manufacturers:
 - a. HoldRite, a brand of Reliance Worldwide Corporation;
 - b. nVent Caddy, a brand of nVent;
 - c. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

- F. Plenum Pipe Supports:
 - 1. Manufacturers:
 - a. HoldRite, a brand of Reliance Worldwide Corporation
 - b. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.

2.7 NONPENETRATING ROOFTOP SUPPORTS FOR LOW-SLOPE ROOFS

- A. Manufacturers:
 - 1. Anvil International; H-Block: www.anvilintl.com/#sle.
 - 2. B-Line, a brand of Eaton Corporation; www.eaton.com/#sle.
 - 3. PHP Systems/Design: www.phpsd.com/#sle.
- B. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
- C. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
- D. Mounting Height: Provide minimum clearance of 6 inches (150 mm) under supported component to top of roofing.

2.8 ANCHORS AND FASTENERS

- A. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
- B. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
- C. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
- D. Preset Concrete Inserts: Continuous metal strut channel and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - 1. Channel Material: Use galvanized steel.
 - 2. Manufacturer: Same as manufacturer of metal strut channel framing system.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

- F. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- G. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.
- I. Secure fasteners according to manufacturer's recommended torque settings.
- J. Remove temporary supports.

END OF SECTION

SECTION 22 0553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Pipe markers.
- D. Underground warning tape.
- E. Ceiling tacks.

1.2 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2015.

1.3 SUBMITTALS

- A. Product Data: Provide manufacturers catalog literature for each product required.
- B. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- C. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

- A. Pipe Markers: 3/4 inch (20 mm) diameter and higher.

2.2 NAMEPLATES

- A. Description: Laminated piece with up to three lines of text.
 - 1. Letter Color: White.
 - 2. Letter Height: 1/4 inch (6 mm).
 - 3. Background Color: Black.
- B. Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.3 TAGS

- A. Metal: Brass, 19 gauge 1-1/2 inch (40 mm) in diameter with smooth edges, blank, smooth edges, and corrosion-resistant ball chain. Up to three lines of text.

2.4 PIPE MARKERS

- A. Comply with ASME A13.1.

- B. Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.
- C. Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- D. Underground Flexible Marker: Bright-colored continuously printed ribbon tape, minimum 6 inches (150 mm) wide by 4 mil, 0.004 inch (0.10 mm) thick, manufactured for direct burial service.
- E. Identification Scheme, ASME A13.1:
 - 1. Primary: External Pipe Diameter, Uninsulated or Insulated.
 - 2. Secondary: Color scheme per fluid service.
 - a. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.

2.5 UNDERGROUND WARNING TAPE

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- B. Non-detectable Type Tape: 6 inches (152 mm) wide, with minimum thickness of 4 mil, 0.004 inch (0.10 mm).
- C. Legend: Type of service, continuously repeated over full length of tape.
- D. Color:

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive identification products.
- B. Prepare surfaces for stencil painting, see Section 09 9123.

3.2 INSTALLATION

- A. Install flexible nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags in clear view and align with axis of piping
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install plastic tape pipe marker around pipe in accordance with manufacturer's instructions.
- E. Install underground plastic pipe markers 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.
- F. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 22 0719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Flexible elastomeric cellular insulation.
- B. Glass fiber insulation.
- C. Jacketing and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019.
- B. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2019.
- E. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).
- F. ASTM C585 - Standard Practice for Inner and Outer Diameters of Thermal Insulation for Nominal Sizes of Pipe and Tubing; 2010 (Reapproved 2016).
- G. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2018).
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum three years of experience.

1.5 REGULATORY REQUIREMENTS

- A. Conform to maximum flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER INSULATION

- A. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible, with wicking material to transport condensed water to the outside of the system for evaporation to the atmosphere.
 - 1. K (Ksi) Value: ASTM C177, 0.23 at 75 degrees F (0.034 at 24 degrees C).
 - 2. Maximum Service Temperature: 220 degrees F (104 degrees C).
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- B. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm (0.029 ng/(Pa s m)).

2.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 - 1. 'K' ('Ksi') value: ASTM C 177; 0.27 at 75 degrees F (0.04 at 24 degrees C).
 - 2. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
 - 3. Maximum Service Temperature: 220 degrees F (104 degrees C).
 - 4. Maximum Moisture Absorption - Pipe Insulation: 3.5 percent, by weight, when tested in accordance with ASTM D 1056.
 - 5. Water Vapor Permeability: 0.20 perm-inches, when tested in accordance with ASTM E 96.
 - 6. Connection: Waterproof vapor barrier adhesive.

2.4 JACKETING AND ACCESSORIES

A. Aluminum Jacket:

1. Thickness: 0.016 inch (0.40 mm) sheet.
2. Finish: Embossed.
3. Joining: Longitudinal slip joints and 2 inch (50 mm) laps.
4. Fittings: 0.016 inch (0.40 mm) thick die-shaped fitting covers with factory-attached protective liner.
5. Metal Jacket Bands: 3/8 inch (10 mm) wide; 0.015 inch (0.38 mm) thick aluminum.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations. Cover with aluminum jacket.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints. Cover with aluminum jacket.
- E. For hot piping conveying fluids 140 degrees F (60 degrees C) or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation. Cover with aluminum jacket.
- F. For hot piping conveying fluids over 140 degrees F (60 degrees C), insulate flanges and unions at equipment. Cover with aluminum jacket.
- G. Inserts and Shields:
 1. Application: Piping 1-1/2 inches (40 mm) diameter or larger.
 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 3. Insert Location: Between support shield and piping and under the finish jacket.
 4. Insert Configuration: Minimum 6 inches (150 mm) long, of same thickness and contour as adjoining insulation; may be factory fabricated.
 5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- H. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 8400.

- I. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces: Finish with aluminum jacket.
- J. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.
- K. Buried Piping: Provide factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with one mil, 0.001 inch (0.025 mm) thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with a polyester film.
- L. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

END OF SECTION

SECTION 22 1005
PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sanitary waste piping, buried within 5 feet (1500 mm) of building.
- B. Sanitary waste piping, above grade.
- C. Domestic water piping, buried within 5 feet (1500 mm) of building.
- D. Domestic water piping, above grade.
- E. Natural gas piping, above grade.

1.2 REFERENCE STANDARDS

- A. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.
- B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.
- C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.
- D. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV; 2016.
- E. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.
- F. ASME B31.1 - Power Piping; 2018.
- G. ASME B31.9 - Building Services Piping; 2017.
- H. ASME BPVC-IV - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; 2019.
- I. ASME BPVC-IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators - Welding Brazing and Fusing Qualifications; 2019.
- J. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2018).
- K. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- L. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- M. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2019.
- N. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- O. ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes; 2015.
- P. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2011.
- Q. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.

- R. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2018.
- S. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
- T. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2016.
- U. ASTM C14M - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, Culvert Pipe and (Metric); 2015a.
- V. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; 2019b.
- W. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015, with Editorial Revision (2018).
- X. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2015.
- Y. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2017.
- Z. ASTM D2513 - Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings; 2019.
- AA. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012 (Reapproved 2018).
- AB. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.
- AC. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing; 2014.
- AD. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2017.
- AE. ASTM D2996 - Standard Specification for Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe; 2017.
- AF. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2016.
- AG. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- AH. ASTM F439 - Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80; 2019.
- AI. ASTM F 708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).
- AJ. AWWA C651 - Disinfecting Water Mains; 2014.
- AK. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; 2017 (Revised 2018).

- AL. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2012 (Revised 2018).
- AM. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- AN. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.
- AO. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.
- AP. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.
- AQ. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.
- AR. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends; 2018.
- AS. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010.
- AT. NSF 61 - Drinking Water System Components - Health Effects; 2019.
- AU. NSF 372 - Drinking Water System Components - Lead Content; 2016.
- AV. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- B. Welders' Certificates: Submit certification of welders' compliance with ASME BPVC-IX.
- C. Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.
- D. Project Record Documents: Record actual locations of valves.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with applicable codes.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.
- D. Welder Qualifications: Certified in accordance with ASME BPVC-IX.
- E. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.5 REGULATORY REQUIREMENTS

- A. Perform Work in accordance with State of New Mexico plumbing code.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Plenum-Installed Acid Waste Piping: Flame-spread index equal or below 25 and smoke-spread index equal or below 50 according to ASTM E84 or UL 723 tests.

2.2 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

- A. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY WASTE PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: CISPI 310, neoprene gaskets and stainless steel 4-band clamp-and-shield assemblies.
- B. PVC Pipe: ASTM D1785 Schedule 40, or ASTM D2241 SDR 26 with not less than 150 psi (1 034 kPa) pressure rating.
 - 1. Fittings: ASTM D2466, PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.
 - 3. If used in return air plenum, piping shall be wrapped with insulation material to meet the flame spread code.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET (1500 MM) OF BUILDING

- A. Copper Pipe: ASTM B88 (ASTM B88M), Type K (A), Drawn (H).
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Joints: ASTM B32, alloy Sn95 solder.
 - 3. Mechanical Press Sealed Fittings: Double-pressed type, NSF 61 and NSF 372 approved or certified, utilizing EPDM, nontoxic, synthetic rubber sealing elements.

2.6 NATURAL GAS PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
 - 1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, wrought steel welding type.
 - 2. Joints: Threaded or welded to ASME B31.1.

2.7 PIPE FLANGES, UNIONS, AND COUPLINGS

- A. Unions for Pipe Sizes 3 inch (80 mm, DN) and Under:
 - 1. Ferrous Pipe: Class 150 malleable iron threaded unions.
 - 2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
- B. Flanges for Pipe Sizes Over 1 inch (25 mm, DN):
 - 1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
 - 2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.8 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
 - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
 - 3. Trapeze Hangers: Welded steel channel frames attached to structure.
 - 4. Vertical Pipe Support: Steel riser clamp.
 - 5. Floor Supports: Concrete pier or steel pedestal with floor flange; fixture attachment.
 - 6. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
 - a. Bases: High density polypropylene. Ensure that material is compatible with the roof manufacturer's requirements.
 - b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.

- c. Steel Components: Stainless steel or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
 - d. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion-resistant material.
 - e. Height: Provide minimum clearance of 6 inches (150 mm) under pipe to top of roofing.
- B. Plumbing Piping - Drain, Waste, and Vent:
- 1. Conform to ASME B31.9.
 - 2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (15 to 40 mm, DN): Malleable iron, adjustable swivel, split ring.
 - 3. Hangers for Pipe Sizes 2 inch (50 mm, DN) and Over: Carbon steel, adjustable, clevis.
 - 4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 - 5. Wall Support for Pipe Sizes to 3 inch (80 mm, DN): Cast iron hook.
 - 6. Wall Support for Pipe Sizes 4 inch (100 mm, DN) and Over: Welded steel bracket and wrought steel clamp.
 - 7. Vertical Support: Steel riser clamp.
 - 8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
 - 9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- C. Plumbing Piping - Water:
- 1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (15 to 40 mm, DN): Malleable iron, adjustable swivel, split ring.
 - 2. Hangers for Cold Pipe Sizes 2 inch (50 mm, DN) and Over: Carbon steel, adjustable, clevis.
 - 3. Hangers for Hot Pipe Sizes 2 to 4 inch (50 to 100 mm, DN): Carbon steel, adjustable, clevis.
 - 4. Wall Support for Pipe Sizes Up to 3 inch (80 mm, DN): Cast iron hook.
 - 5. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
 - 6. Floor Support for Hot Pipe Sizes to 4 inch (100 mm, DN): Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
 - 7. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
- 1. Concrete Wedge Expansion Anchors: Comply with ICC-ES AC193.
 - 2. Masonry Wedge Expansion Anchors: Comply with ICC-ES AC01.
 - 3. Concrete Screw Type Anchors: Comply with ICC-ES AC193.
 - 4. Masonry Screw Type Anchors: Comply with ICC-ES AC106.
 - 5. Concrete Adhesive Type Anchors: Comply with ICC-ES AC308.
 - 6. Other Types: As required.
 - 7. Manufacturers:

2.9 PIPE SLEEVE-SEAL SYSTEMS

A. Modular Mechanical Seals:

1. Elastomer-based interlocking links continuously fill annular space between pipe and wall-sleeve, wall or casing opening.
2. Watertight seal between pipe and wall-sleeve, wall or casing opening.
3. Size and select seal component materials in accordance to service requirements.
4. Glass reinforced plastic pressure end plates.

2.10 BALL VALVES

- A. Construction, 4 Inches (100 mm) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze body, 304 stainless steel ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder ends with union.
- B. Construction, 4 Inches (100 mm) and Smaller: MSS SP-110, Class 150, 400 psi (2760 kPa) CWP, bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder ends with union.

2.13 PRESSURE RELIEF VALVES

- A. ANSI Z21.22, AGA certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.
- B. Pressure Relief Valves:
- C. Temperature and Pressure Relief Valves:
 1. Manufacturers:
 - a. Cla-Val Co: www.cla-val.com.
 - b. Henry Technologies: www.henrytech.com.
 - c. Watts Regulator Company: www.wattsregulator.com.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. See Section 22 0516.
- G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
 - 1. See Section 22 0719.
- H. Provide access where valves and fittings are not exposed.
- I. Install vent piping penetrating roofed areas to maintain integrity of roof assembly.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welding.
- K. Provide support for utility meters in accordance with requirements of utility companies.
- L. Prepare exposed, unfinished pipe, fittings, supports, and accessories for finish painting.
- M. Excavate in accordance with Section 31 2316.
- N. Backfill in accordance with Section 31 2323.
- O. Install valves with stems upright or horizontal, not inverted. See Section 22 0523.
- P. Install water piping to ASME B31.9.
- Q. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
- R. Sleeve pipes passing through partitions, walls, and floors.
- S. Inserts:
 - 1. Provide inserts for placement in concrete formwork.
 - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
 - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches (100 mm, DN).
 - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- T. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.9.
 - 2. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
 - 3. Place hangers within 12 inches (300 mm) of each horizontal elbow.
 - 4. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 - 6. Provide copper plated hangers and supports for copper piping.

7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
 8. Support cast iron drainage piping at every joint.
- U. Pipe Sleeve-Seal Systems:
1. Install manufactured sleeve-seal systems in sleeves located in grade slabs and exterior concrete walls at piping entrances into building.
 2. Provide sealing elements of the size, quantity, and type required for the piping and sleeve inner diameter or penetration diameter.
 3. Locate piping in center of sleeve or penetration.
 4. Install field assembled sleeve-seal system components in annular space between sleeve and piping.
 5. Tighten bolting for a watertight seal.
 6. Install in accordance with manufacturer's recommendations.
- V. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- W. Where PVC piping is installed in plenum spaces, Contractor shall install fire wrap or fire resistant insulation that meets minimum code requirements for Smoke Developed Index and Flame Spread Requirements.

3.4 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Install globe or ball valves for throttling, bypass, or manual flow control services.
- E. Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.
- F. Provide spring-loaded check valves on discharge of water pumps.
- G. Provide flow controls in water recirculating systems where indicated.

3.5 TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch (10 mm) vertically of location indicated and slope to drain at minimum of 1/4 inch per foot (1:50) slope.
- B. Water Piping: Slope at minimum of 1/32 inch per foot (1:400) and arrange to drain at low points.

3.6 FIELD TESTS AND INSPECTIONS

- A. Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.

- B. Domestic Water Systems:
 - 1. Perform hydrostatic testing for leakage prior to system disinfection.
 - 2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
 - 3. General:
 - a. Fill the system with water and raise static head to 10 psi (345 kPa) above service pressure. Minimum static head of 50 to 150 psi (345 to 1,034 kPa). As an exception, certain codes allow a maximum static pressure of 80 psi (551.6 kPa).
- C. Gas Distribution Systems:
 - 1. Test Preparation: Close each appliance valve or disconnect and cap each connected appliance.
 - 2. General Systems:
 - a. Inject a minimum of 10 psi (68.9 kPa) of compressed air into the piping system for a duration of 15 minutes and verify with a gauge that no perceptible pressure drop is measured.
 - b. Ensure test pressure gauge has a range of twice the specific pressure rate selected with an accuracy of 1/10 of 1 pound (0.45 kg).
- D. Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.7 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed, and clean.
- B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.8 SERVICE CONNECTIONS

- A. Provide new sanitary sewer services. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- B. Provide new water service complete with approved reduced pressure backflow preventer and water meter with by-pass valves, pressure reducing valve, and sand strainer.

1. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Calk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.
2. Provide 18 gauge, 0.0478-inch (1.21 mm) galvanized sheet metal sleeve around service main to 6 inch (150 mm) above floor and 6 feet (1800 mm) minimum below grade. Size for minimum of 2 inches (50 mm) of loose batt insulation stuffing.
3. Catastrophic drain piping from reduced pressure backflow preventor shall be installed with an air-gap fitting and the piping shall be sized according to the reduced pressure backflow preventor manufacturer's recommendations. Pipe shall slope to drain and terminate to daylight (exterior) with pest flap.

3.9 SCHEDULES

A. Pipe Hanger Spacing:

1. Metal Piping:
 - a. Pipe Size: 1/2 inch (15 mm, DN) to 1-1/4 inch (32 mm, DN):
 - 1) Maximum Hanger Spacing: 6.5 ft (2 m).
 - 2) Hanger Rod Diameter: 3/8 inches (9 mm).
 - b. Pipe Size: 1-1/2 inch (40 mm, DN) to 2 inch (50 mm, DN):
 - 1) Maximum Hanger Spacing: 10 ft (3 m).
 - 2) Hanger Rod Diameter: 3/8 inch (9 mm).
 - c. Pipe Size: 2-1/2 inch (65 mm, DN) to 3 inch (80 mm, DN):
 - 1) Maximum Hanger Spacing: 10 ft (3 m).
 - 2) Hanger Rod Diameter: 1/2 inch (13 mm).
 - d. Pipe Size: 4 inch (100 mm, DN) to 6 inch (150 mm, DN):
 - 1) Maximum Hanger Spacing: 10 ft (3 m).
 - 2) Hanger Rod Diameter: 5/8 inch (15 mm).
2. Plastic Piping:
 - a. All Sizes:
 - 1) Maximum Hanger Spacing: 6 ft (1.8 m).
 - 2) Hanger Rod Diameter: 3/8 inch (9 mm).

END OF SECTION

SECTION 22 1006
PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Drains.
- B. Cleanouts.
- C. Hose bibbs/hydrants.
- D. Backflow preventers.
- E. Water hammer arrestors.
- F. Sanitary waste interceptors.
- G. Mixing valves.
- H. Relief valves.
- I. Air vents.
- J. Floor drain trap seals.

1.2 REFERENCE STANDARDS

- A. ASME A112.6.4 - Roof, Deck, and Balcony Drains; 2008 (Reaffirmed 2012).
- B. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers; 2017.
- C. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Principle Fire Protection Backflow Preventers; 2011.
- D. NSF 61 - Drinking Water System Components - Health Effects; 2019.
- E. NSF 372 - Drinking Water System Components - Lead Content; 2016.
- F. PDI-WH 201 - Water Hammer Arresters; 2017.

1.3 SUBMITTALS

- A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- B. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- C. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
- D. Manufacturer's qualification statement.
- E. Operation Data: Indicate frequency of treatment required for interceptors.
- F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- G. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Loose Keys for Outside Hose Bibbs: One.
2. Extra Hose End Vacuum Breakers for Hose Bibbs: One.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 DRAINS

A. Manufacturers:

1. Jay R. Smith Manufacturing Company.
2. Zurn Industries, LLC: www.zurn.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

B. Floor Drain:

1. ASME A112.6.3; coated cast iron body with bottom outlet, combination invertible membrane clamp and adjustable collar with seepage slots and "TYPE B" polished nickel bronze, light-duty strainer.
 - a. Provide with Proset Trap Guard or equal.

C. Floor Sink (FS-1):

1. 12" x 12" x 10" deep, cast iron body with square slotted grate, acid resisting porcelain enamel interior and top, anti-splash interior bottom dome strainer. Deep seal P-trap, size as indicated on plans.
 - a. Provide with Proset Trap Guard or equal.

2.3 CLEANOUTS

A. Manufacturers:

1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
2. Zurn Industries, LLC: www.zurn.com.
3. Substitutions: See Section 01 6000 - Product Requirements.

B. Cleanouts at Exterior Surfaced Areas (CO):

C. Cleanouts at Exterior Unsurfaced Areas (CO):

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.

D. Cleanouts at Interior Finished Floor Areas (CO):

1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.
- E. Cleanouts at Interior Finished Wall Areas (WCO):
 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

2.4 HOSE BIBBS

- A. Manufacturers:
 1. Woodford Manufacturing Company: www.woodfordmfg.com
 2. Watts Regulator Company: www.wattsregulator.com.
 3. Zurn Industries, LLC: www.zurn.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Interior Hose Bibbs:
 1. 3/4" inlet, 3/4" outlet, flush mounted, wall flange faucet, rough bronze finish, with external backflow preventer.
 2. Bronze or brass with integral mounting flange, replaceable hexagonal disc, hose thread spout, chrome-plated where exposed with handwheel, integral vacuum breaker in compliance with ASSE 1011.

2.5 HOSE BIBB/HYDRANTS

- A. Manufacturers:
 1. Watts Regulator Company: www.wattsregulator.com.
 2. Jay R. Smith Manufacturing Company: www.jayrsmith.com/#sle.
 3. Zurn Industries, LLC: www.zurn.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Hose Bibb/Wall Hydrants:
 1. Encased Ecolotrol "anti-siphon" automatic draining wall hydrant for flush installation. Complete with non-freeze type integral backflow preventer, bronze casing, all bronze interior parts, non-turning operating rod with free-floating compression closure valve, replaceable bronze seat and seat washer, and combination 3/4" female or 1" male straight IP inlet. Nickel bronze box and hinged cover with operating key lock and "WATER" cast on cover.

2.6 BACKFLOW PREVENTERS

- A. Manufacturers:
 1. Conbraco Industries, Inc: www.apollovalves.com.
 2. FebCo - Watts : www.febcoonline.com.
 3. Zurn Industries, LLC: www.zurn.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reduced Pressure Backflow Preventer Assembly:
 1. ASSE 1013; cast bronze body and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief

valve located between check valves; third check valve that opens under back pressure in case of diaphragm failure, and non-threaded vent outlet.2.

C. Reduced Pressure Backflow Preventer Assembly:

1. ASSE 1013 and NSF 61 compliant reinforced-nylon body and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve that opens under back pressure in case of diaphragm failure, integral male test fittings, and non-threaded vent outlet.
2. Size: 3/4 to 2 inch (20 to 50 mm, DN) assembly with threaded gate valves.

2.7 WATER HAMMER ARRESTORS

A. Manufacturers:

1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
2. Watts Regulator Company, a part of Watts Water Technologies: www.wattsregulator.com.
3. Zurn Industries, LLC: www.zurn.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

B. Water Hammer Arrestors:

1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F (minus 73 to 149 degrees C) and maximum 250 psi (1700 kPa) working pressure.

2.8 MIXING VALVES

A. Thermostatic Mixing Valves:

1. Manufacturers:
 - a. Leonard Valve Company: www.leonardvalve.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
2. Valve: Chrome-plated cast brass body, stainless steel or copper alloy bellows, integral temperature adjustment.
3. Accessories:
 - a. Check valve on inlets.
 - b. Volume control shut-off valve on outlet.
 - c. Stem thermometer on outlet.
 - d. Strainer stop checks on inlets.
4. Cabinet: 16 gauge, 0.0598 inch (1.52 mm) prime-coated steel, for recessed mounting with keyed lock.

2.9 RELIEF VALVES

- A. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled.

2.10 AIR VENTS

A. Washer Type:

1. Brass with hygroscopic fiber discs, vent ports, adjustable cap for manual shut-off, and integral spring loaded ball check valve.

2.11 FLOOR DRAIN TRAP SEALS

- A. Description: Push-fit EPDM or silicone fitting with a one-way membrane.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Encase exterior cleanouts in concrete flush with grade.
- D. Install floor cleanouts at elevation to accommodate finished floor.
- E. Install approved potable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
- F. Pipe relief and catastrophic drain from reduced pressure principal backflow preventer to exterior wall/daylight, slope to drain. Provide with pest flap at exterior outlet.
- G. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatory sinks, washing machine outlets, or flush valves.
- H. Coordinate installation of components of this section with installation of process equipment and piping components.

END OF SECTION

SECTION 22 3000
PLUMBING EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial gas-fired water heaters.
- B. In-line circulator pumps.
- C. Condensate removal pumps.

1.2 REFERENCE STANDARDS

- A. AHRI Directory of Certified Product Performance - Air-Conditioning, Heating, and Refrigeration Institute (AHRI); Current Edition.
- B. ANSI Z21.10.3 - Gas-Fired Water Heaters - Volume III - Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous; 2015.
- C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2019.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
 - 2. Indicate pump type, capacity, power requirements.
 - 3. Provide electrical characteristics and connection requirements.
- B. Shop Drawings:
 - 1. Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.
- C. Project Record Documents: Record actual locations of components.
- D. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

F. Project Record Documents: Record actual locations of components.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Certifications:
 - 1. Water Heaters: NSF approved.
 - 2. Gas Water Heaters: AHRI Directory of Certified Product Performance.
 - 3. Water Tanks: ASME labeled to ASME BPVC-VIII-1.
 - 4. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.
- C. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.
- D. Performance: Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.6 WARRANTY

- A. Provide five year manufacturer warranty for domestic water heaters and water storage tanks.

PART 2 PRODUCTS

2.1 WATER HEATERS

- A. Manufacturers:
 - 1. A.O. Smith Water Products Co: www.hotwater.com.
 - 2. Bock Water Heaters, Inc: www.bockwaterheaters.com.
 - 3. Rheem Manufacturing Company: www.rheem.com.
 - 4. State: www.state.com.
- B. Commercial Electric Water Heaters:
 - 1. Type: Electric, vertical storage.
 - 2. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
 - 3. Performance: See schedule.
 - 4. Tank: Glass lined welded steel ASME labeled; multiple flue passages, 4 inch (100 mm) diameter inspection port, thermally insulated with minimum 2 inches (50 mm) glass fiber, encased in corrosion-resistant steel jacket; baked-on enamel finish; floor shield and legs.
 - 5. Accessories:
 - a. Water Connections: Brass.
 - b. Dip Tube: Brass.

- c. Drain valve.
- d. Anode: Magnesium.
- 6. Applications:
 - a. Automatic storage water heater.
 - b. For operation in high altitude installations.

2.2 DIAPHRAGM-TYPE COMPRESSION TANKS

- A. Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psig (860 kPa), with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.
- B. Accessories: Pressure gauge and air-charging fitting, tank drain; precharge to 12 psig (80 kPa).

2.3 IN-LINE CIRCULATOR PUMPS

- A. Casing: Bronze, rated for 125 psig (860 kPa) working pressure, with stainless steel rotor assembly.
- B. Impeller: Bronze.
- C. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.
- D. Seal: Carbon rotating against a stationary ceramic seat.
- E. Drive: Flexible coupling.

2.4 CONDENSATE REMOVAL PUMPS

- A. Construction: Commercial grade, nonferrous pump with stainless steel shaft, integral discharge check valve, integral float switch, safety switch, thermoplastic reservoir, motor assembly, and power cord with ground.
- B. Safety: UL 778.

2.5 ELECTRICAL WORK

- A. Provide electrical motor driven equipment specified complete with motors, motor starters, controls, and wiring.
- B. Electrical characteristics to be as specified or indicated.
- C. Supply manual or automatic control and protective or signal devices required for the operation specified, and any control wiring required for controls and devices not shown.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.

- B. Coordinate with plumbing piping and related electrical work to achieve operating system.
- C. Domestic Water Storage Tanks:
 - 1. Provide steel pipe support, independent of building structural framing members.
 - 2. Clean and flush after installation. Seal until pipe connections are made.
- D. Pumps:
 - 1. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
 - 2. Align and verify alignment of base mounted pumps prior to start-up
 - 3. Provide electrical interlocking from cooling condensate pump safety switch to associated HVAC unit(s) furnished under other Sections.

END OF SECTION

SECTION 22 4000
PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water closets; floor mounted.
- B. Lavatories; wall hung.
- C. Urinals
- D. Sinks.
- E. Under-lavatory pipe supply covers.
- F. Bi-level, electric water coolers.
- G. Mop sinks.

1.2 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASHRAE Std 18 - Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration; 2013.
- C. ARI 1010 - Drinking Fountains and Self-Contained Mechanically Refrigerated Drinking Water Coolers; 2002.
- D. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
- E. ASME A112.18.1 - Plumbing Supply Fittings; 2012.
- F. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2017).
- G. ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures; The American Society of Mechanical Engineers; 2008 (R2011).
- H. ASME A112.19.2 - Ceramic Plumbing Fixtures; 2018.
- I. ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2017.
- J. ASME A112.19.5 - Flush Valves and Spuds for Water Closets, Urinals, and Tanks; 2017.
- K. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- L. NSF 61 - Drinking Water System Components - Health Effects; 2019.
- M. NSF 372 - Drinking Water System Components - Lead Content; 2016.
- N. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.3 SUBMITTALS

- A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- B. Manufacturer's Instructions: Indicate installation methods and procedures.
- C. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Faucet Washers: Two sets of each type and size.
 - 2. Extra Lavatory Supply Fittings: Two sets of each type and size.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.6 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Water Efficiency: EPA WaterSense label is required for all water closets, urinals, lavatory faucets, and showerheads.

2.2 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for installation of plumbing systems.
- B. Comply with UL (DIR) requirements.
- C. Perform work in accordance with local health department regulations.
- D. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of installation.

2.3 FLUSH VALVE WATER CLOSETS: Floor Mount.

- A. Manufacturers:
 - 1. American Standard, Inc: www.americanstandard-us.com.
 - 2. Gerber Plumbing Fixtures LLC: www.gerberonline.com.
 - 3. Kohler Company: www.kohler.com.
 - 4. Zurn Industries, Inc: www.zurn.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Water Closets (WC-2): Vitreous china, ASME A112.19.2, floor mounted, ADA compliant, siphon jet flush action, china bolt caps.
 - 1. Bowl: ASME A112.19.2; 17" ADA height with elongated rim.
 - 2. Flush Valve: Exposed (top spud).
 - 3. Flush Operation: Sensor operated. Hard wired, battery backup.
 - 4. Color: White.
- C. Water Closets (WC-1): Vitreous china, ASME A112.19.2, floor mounted, siphon jet flush action, china bolt caps.
 - 1. Bowl: ASME A112.19.2; 14" standard height with elongated rim.
 - 2. Flush Valve: Exposed (top spud).
 - 3. Flush Operation: Sensor operated.
 - 4. Color: White.
- D. Flush Valves:
 - 1. Manufacturers:
 - a. American Standard, Inc: www.americanstandard-us.com.
 - b. Sloan Valve Company: www.sloanvalve.com.
 - c. Zurn Industries, Inc: www.zurn.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Sensor-Operated, battery powered.
 - a. Type: ASME A112.19.5; chloramine-resistant clog-resistant dual-seat diaphragm valve complete with vacuum breaker, stops and accessories.
 - b. Mechanism: Solenoid-operated piston or electronic motor-actuated operator with low-voltage powered infrared sensor, and mechanical override or override push button.
 - c. Supplied Volume Capacity: 1.6 gal per flush.
- E. Toilet Seats:
 - 1. Commercial Heavy Duty Solid white plastic, open front, extended back, self-sustaining hinge, brass bolts, without cover.
 - 2. Stainless steel check hinge and Anti-microbial protection.

2.4 WALL HUNG URINALS

- A. Manufacturers:
 - 1. American Standard, Inc: www.americanstandard-us.com.
 - 2. Kohler Company: www.kohler.com.
 - 3. Zurn Industries, Inc: www.zurn.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

- B. Urinals (UR-1): Vitreous china, ASME A112.19.2, ADA compliant, wall hung with side shields and concealed carrier.
 - 1. Flush Volume: 0.125 gallons, maximum.
 - 2. Flush Style: Washout.
 - 3. Flush Valve: Exposed (top spud).
 - 4. Flush Operation: Sensor operated. Battery powered.
 - 5. Trapway Outlet: Integral.
 - 6. Removable stainless steel strainer.
 - 7. Supply Size: 3/4 inch (19 mm).
 - 8. Outlet Size: 2 inches (50 mm).
- C. Flush Valves:
- D. Sensor-Operated:
 - 1. Type: ASME A112.19.5; chloramine-resistant, clog-resistant dual-seat diaphragm valve with vacuum breaker, stops and accessories.
 - 2. Mechanism: Solenoid-operated piston or electronic motor-actuated operator with low-voltage powered infrared sensor, and mechanical override or override push button.
 - 3. Supplied Volume Capacity: 0.125 gal per flush.
- E. Urinal Carriers:
 - 1. Manufacturers:
 - a. Jay R. Smith MFG. Co: www.jrsmith.com.
 - b. Sloan Valve Company.
 - c. Zurn Industries, Inc: www.zurn.com.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

2.5 LAVATORIES

- A. Manufacturers:
 - 1. American Standard, Inc: www.americanstandard-us.com.
 - 2. American Standard.
 - 3. Gerber Plumbing Fixtures LLC: www.gerberonline.com.
 - 4. Kohler Company: www.kohler.com.
 - 5. Zurn Industries, Inc: www.zurn.com.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Vitreous China Wall Hung Basin (L-1): ASME A112.19.2; vitreous china wall hung lavatory, 20 by 18 inch (508 by 457 mm) minimum, with 4 inch (100 mm) high back, rectangular basin with splash lip, front overflow, and soap depression.
 - 1. Drilling Centers: 4 inch (100 mm).
- C. Supply Faucet Manufacturers:
 - 1. American Standard, Inc: www.americanstandard-us.com.
 - 2. Kohler Company: www.kohler.com.
 - 3. Zurn Industries, Inc: www.zurn.com.
 - 4. Sloan Company; www.sloan.com

- E. Sensor Operated Faucet: Cast brass, chrome plated, deck mounted with sensor located on neck of spout.
 - 1. Spout Style: Standard.
 - 2. Power Supply: Battery powered.
 - 3. Mixing Valve: Provided as accessory.
 - 4. Water Supply: 1/2 inch (13 mm) compression connections.
 - 5. Aerator: Vandal resistant, 0.35 GPM (1.35 LPM).
 - 6. Automatic Shut-off: 10 seconds.
 - 7. Sensor range: Factory set at 3 inch (76 mm) adjustable up to 24 inch (610 mm).
 - 8. Finish: Polished chrome.
- F. Accessories:
 - 1. Chrome plated 17 gage, 0.0538 inch (1.37 mm) brass 10" P-trap with clean-out plug and arm with escutcheon.
 - 2. Lever 1/4 turn stops.
 - 3. For Exposed supplies & traps - Combination Kit - one trap protector and two supply stop protectors, satin white pvc resin. Antimicrobial, resists thermal transfer, and is ADA compliant. Trap protector fits tubular and semi-cast P-traps.
 - 4. Carrier:
 - a. Manufacturers:
 - 1) Jay R. Smith MFG. Co: www.jrsmith.com.
 - 2) Sloan Valve Company.
 - 3) Zurn Industries, Inc: www.zurn.com.
 - b. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, concealed arm supports, bearing plate and studs.
- G. Lavatory Carrier:
 - 1. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.

2.6 UNDER-LAVATORY PIPE SUPPLY COVERS

- A. General:
 - 1. Insulate exposed drainage piping including hot, cold and tempered water supplies under lavatories or sinks per ADA Standards.
 - 2. Construction: 1/8 inch (3.2 mm) PVC with antimicrobial, antifungal and UV resistant properties.
 - a. Comply with ASME A112.18.9 for covers on accessible lavatory piping.
 - b. Comply with ICC A117.1.

2.8 ELECTRIC WATER COOLERS(EWC)

- A. Manufacturers:
 - 1. Basis of design: Elkay Manufacturing Company; EZSTL8WSLK: www.elkay.com.
 - 2. Haws Corporation: www.hawsco.com.
- B. Water Cooler: Bi-level, electric, mechanically refrigerated; surface mounted, ADA compliant; stainless steel top, vinyl on steel body, elevated anti-squirt bubbler with

stream guard, automatic stream regulator, push button, mounting bracket; integral air cooled condenser and stainless steel grille.

- C. Provide with integral bottle filling station.
- D. Capacity: 8 gallons per minute (30.3 liters per minute) of 50 degrees F (10 degrees C) water with inlet at 80 degrees F (27 degrees C) and room temperature of 90 degrees F (32 degrees C), when tested with ASHRAE Std 18.
 - 1. Electrical: 115 VAC, 60 Hertz compressor, 6 foot (2 m) cord and plug for connection to electric wiring system including grounding connector.

2.9 MOP SINKS (MS-1)

- A. Manufacturers:
 - 1. Just Manufacturing Company: www.justmfg.com/#sle.
 - 2. Zurn Industries, Inc: www.zurn.com/#sle.
 - 3. Stern-Williams, basis of design. www.sternwilliams.com.
 - 4. Or equal.
- B. Material: Molded-Stone.
- C. Grid Strainer: Stainless steel; integral; removable.
- D. Dimensions: As indicated on drawings.
- E. Accessories:
 - 1. Faucet: Chrome plated with vacuum breaker, integral stops, adjustable wall brace, pail hook, 3/4" hose thread on spout, body inlets 8" on center to center, four arm handles, valves contain renewable hub, renewable seats, swivel discs, encased washers, brass washer screws. Commercial red brass allow casting-rough finish. Chrome plating exceeding requirements of ANSI/ASTM B-456-71. Indicators cold (blue) and hot (red) are included. In the USA meets or exceeds requirements of ANSI-A112.18.1M-1979 for "Finished and Rough Brass plumbing fixture Fittings.
 - 2. 5 feet (1.5 m) of 1/2 inch (13 mm) diameter plain end reinforced rubber hose.
 - 3. Hose clamp hanger.
 - 4. Mop hanger.
 - 5. Stainless steel bumper guards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with 1/4 turn lever stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall carriers and bolts.
- E. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.5 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

- A. Clean plumbing fixtures and equipment.

3.7 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.
- B. Do not permit use of fixtures by construction personnel.
- C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 23 0010
MECHANICAL GENERAL PROVISIONS

PART 1 GENERAL

1.1 PROVISIONS:

- A. The Mechanical Specifications are subject to all the requirements of the General Conditions of the Contract and Specifications and shall be used in conjunction therewith. The Contractor shall refer to other divisions of the Drawings and Specifications for work which must be carried on in conjunction with the Mechanical work so that the construction operations can proceed without harm to the Owner for interference, delay or absence of coordination.

1.2 DRAWINGS AND SPECIFICATION COORDINATION:

- A. Drawings and specification indicate the extent and general arrangement of the Equipment and systems, and intend to provide the Owner with complete, functioning systems under this Contract.
- B. Should conditions necessitate a rearrangement of piping, ductwork, equipment, etc., such departures and the reasons, therefore shall be submitted to the Architect by the Contractor for approval, in the form of detailed drawings showing the proposed changes. No such changes shall be made without the prior written approval of the Engineer. Equipment and piping arrangements shall provide adequate and acceptable clearance for entry, servicing and maintenance.
- C. Drawings and Specifications shall be considered as cooperative, and work or materials called for by one and not mentioned in the other shall be done and furnished as though treated by both.
- D. In the case of insufficient information and discrepancies in figures, dimensions, details, Drawings, Specifications, or construction notes, the Architect shall be notified immediately and his decision shall determine the necessary adjustment. Without such decision, said discrepancies shall not be adjusted by the Contractor. In case of any settlement or any complication arising from such adjustment to the Contractor, he shall bear all extra expense involved. There shall be no additional expense to the Owner, Architect or Engineer.
- E. Should it appear that the work intended to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the drawings or specifications, the Contractor shall apply to the Architect for such further drawings or explanations as may be necessary, allowing a reasonable time for the Architect to supply same, and the Contractor shall conform to same as part of the Contract.
- F. Should any doubt or question arise in respect to the true meaning of the Drawings or Specifications, reference shall be made to the Architect whose decision shall be final and conclusive.
- G. All piping and all ducts in the finished areas of the building shall be run concealed in chases, furrings, suspended ceilings, etc., unless noted or directed otherwise. Should

any condition arise which would cause any piping or duct to be exposed in finished areas, it shall immediately be called to the Architect's attention and this Contractor shall bear any and all expense in connection with rearranging his work as directed to facilitate its concealment. In unfinished spaces such as ceiling spaces and equipment rooms, all pipe lines shall be run to a continuous grade and square to the building.

- H. Contractor shall thoroughly acquaint himself with the details of the Drawings and Specifications before submitting his bid as no allowance will be made because of unfamiliarity with these details. Place all inserts required for concrete construction in place in the forms before concrete is poured and in masonry walls while they are under construction. All concealed piping and ducts shall be installed prior to the time the chases and furrings are fabricated.
- I. The Drawings do not give exact details as to elevations of piping, exact locations, etc., and do not show all offsets, control lines, pilot lines and their installation details. The Contractor shall carefully lay out his work at the site to conform to the structural conditions, provide proper grading of lines, to avoid all obstructions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide an integrated, satisfactory operation installation.
- J. Should the particular equipment which any Contractor proposes to install, require other space conditions than those indicated on the drawings, the Contractor shall arrange for such space with the Architect before submitting his bid. Should changes become necessary on account of failure to comply with these details, the Contractor shall make such necessary changes at his (the Contractor's) own expense.
- K. Contractor shall submit working scale drawings of all his apparatus and equipment which in any way varies from these specifications and plans which shall be checked by the Architect and approved before the work is started. Interference with the structural conditions shall be corrected before work proceeds.
- L. All equipment shall be installed in accordance with the manufacturer's recommendations. Provide all accessories and components for optimum operation as recommended by the manufacturer.

1.3 FIELD MEASUREMENTS:

- A. Prior to the start of fabrication and/or installation the Contractor shall verify all dimensions, clearances and field conditions governing the mechanical work.
- B. No extra compensation shall be claimed or allowed on account of difference between actual dimensions and those indicated on the drawings.
- C. The Contractor shall examine adjoining work on which plumbing, heating ventilating and air conditioning is dependent for perfect efficiency and shall report any work that must be corrected.
- D. No waiver of responsibility for defective work shall be claimed or allowed due to failure to report unfavorable conditions affecting the mechanical work.

1.4 SHOP DRAWINGS:

- A. The review of Shop Drawings or catalog data by the Architect shall not relieve the Contractor from responsibility for deviations from the Drawings and Specifications

unless he has, in writing, specifically called attention to such deviations at the time of submission and has obtained the permission of the Architect thereon; nor shall it relieve him from the responsibility for error of any kind in shop drawings.

- B. Shop drawings will be returned unchecked unless the following information is included: reference to all pertinent data in the Specifications or on the drawings, symbol designation of equipment as indicated on drawing, size and characteristics of the equipment, name of the project and a space large enough to accept an approval stamp. The data submitted shall reflect the actual equipment performance under the specified conditions and shall not be a copy of the scheduled data on the drawings.
- C. Additional fees will be charged for reviewing second submittal and shop drawings on equipment, fixtures and system, etc. that had been approved on the first submittal review. The fees will be on a time-and-material basis at current hourly rates. The additional fees will be at the Contractor expense with no expense to the owner.

1.5 CODES AND STANDARDS:

- A. All work shall be performed in strict accordance with the applicable provisions of the Uniform Plumbing Code and Gas Ordinance of the State of New Mexico, the Uniform Mechanical Code, the International Building Code, the Life Safety Code, the Albuquerque Energy Conservation Code, the New Mexico Administrative Code and any other applicable codes and ordinances.
- B. Where the Contract Documents indicate materials or construction in excess of Code requirements, the Contract Documents shall govern.
- C. The Owner and the Architect shall be held free and harmless from liability of any kind or nature arising from his failure to comply with codes and ordinances.
- D. The Contractor shall include in his bid to apply for and pay for all permits and certificates of inspection including connections, meter setup fees or extension/expansion of all utility lines.
- E. Appropriate standards, such as ASA or ASTM or other established standards, shall become part of the Contract Documents to the extent they are referred to herein.

1.6 ELECTRICAL SERVICES:

- A. Motor starters, control equipment and wirings indicated on the electrical drawings, except items otherwise specifically noted, will be furnished and installed by the Contractor.
- B. All equipment and controls shall be coordinated with Division 26, Electrical, to insure that all required components are furnished and properly installed. No additional expense will be allowed due to lack of coordination.
- C. The Contractor must refer to the electrical control equipment and wiring shown on the Electrical Drawings. Any changes or additions required by specified equipment furnished shall be the complete responsibility of the Contractor furnishing the equipment.
- D. All electrical equipment characteristics (voltage, etc.) must be verified by the Architect prior to ordering.

- E. All motors shall be built in accordance with the current applicable IEEE, ASA, and NEMA standards. All general purpose motors shall be open drip-proof machines for installation indoors and/or in protected locations. Totally enclosed fan cooled (TEFC) motors shall be used in all areas of exposure to weather or other environmental contamination. Motors shall be rated explosion proof when location is in hazardous atmospheres. Type II weather protected motors may be used in lieu of TEFC motors on cooling towers, roof fan units, and similar equipment. Motors mounted in direct sun shall be provided with a shield to prevent direct radiation from the sun when the sun is 45 degrees or greater above the horizon. All motors shall have copper windings. All motors to have minimum power factor of 85% or have switched correction to 90%. Starters shall meet all requirements furnished by the Contractor.
- F. Unless indicated otherwise, motors shall be NEMA Design B with a service factor of 1.15 with 40 degrees centigrade rise and total temperature rise of 65 degrees centigrade ambient and when powered from the system voltage feeding the motor. TEFC motors shall have a service factor of 1.00 with total temperature rise of 65 degrees centigrade in the above conditions. Motors located in areas exceeding 40 degrees centigrade ambient shall be factory-rated for the ambient temperature of the motor environment. Single phase motors shall generally be NEMA Type N split phase induction motors with built-in thermal protectors. Single phase motors connected on loads requiring high starting torque shall be capacitor-start induction motors. Single phase motors of 1/10 HP or less may be shaded pole induction motors.
- G. If the contractor proposes to furnish motors varying in horsepower and/or characteristics from those specified, he shall first inform the Architect of the change and shall then coordinate the change with the Contractor and shall pay all additional charges in connection with the change.

1.7 ALTITUDE RATINGS:

- A. Unless otherwise noted, all specified equipment capacities, air quantities, etc., are for site elevation above sea level, and adjustments to the manufacturer's ratings must be made accordingly to achieve the design capacities.

1.8 FLUSHING AND DRAINING:

- A. Properly drain and flush all ducts and pipes before use of acceptance to insure that all debris is completely removed. Damage caused by such debris remaining in the ducts or pipes shall be repaired by the contractor at his expense. This contractor shall demonstrate to the architect's representative that all piping is clean.

1.9 CLEANING:

- A. Remove from the building construction site all rubbish and dirt as it accumulates. At completion, all areas shall be broom cleaned and all obstructions, surplus materials, etc., removed. All disposable filters in air handling units shall be replaced and all permanent filters shall be cleaned.

1.10 UTILITIES:

- A. The location, size, and elevation of existing sewer lines and the location, size and pressure of existing water and gas lines are shown in accordance with data given this office by others. As engineers, we cannot and do not guarantee the accuracy of this data. Each bidder shall check and verify this data. The points of connection to utility lines are approximate only and shall be verified by each bidder prior to submitting his bid.

1.11 SITE VISIT:

- A. Visit the site prior to bidding and verify the conditions under which the mechanical systems are to be installed. No subsequent allowance shall be made in his behalf for failure to make such a visit.

PART 2 MATERIALS

2.1 QUALITY:

- A. The materials and equipment shall be new and shall be the standard products of the manufacturers regularly engaged in the production of Plumbing, Heating, Cooling, Ventilating and Fire Protection Equipment, and shall be the manufacturer's latest standard design. Where two or more units of the same class of equipment are required, these units shall be the products of the same manufacturer. However, the component parts of the systems need not be the products of the same manufacturer. Specific equipment specified hereinafter is to be considered a standard of quality and operation. Should this Contractor desire and install equipment and materials other than that specifically mentioned, he shall submit complete information and engineering data on same to the Architect. This Contractor shall obtain written approval before purchasing proposed substitute equipment. In general, all capacities of equipment, and motor and starter characteristics are shown in schedules on the drawings. Reference shall be made to the schedules for each information. The capacities shown are minimum capacities. Variations in the characteristics will be permitted only on written approval of the Architect. All equipment shall be shipped to the job with not less than a prime coat of paint or as specified hereinafter. Insofar as it is possible, all items of the same type (i.e., pumps, fans, etc.) shall be by the same manufacturer. Where installation instructions are not included in these specifications or on the plans, the manufacturer's instructions shall be followed. All equipment affected by altitude shall be rated to operate at the altitude where it is to be installed.

2.2 PROTECTION OF MATERIALS AND EQUIPMENT:

- A. Materials and equipment shall be protected at all times.
- B. The Contractor shall make good all damage caused directly or indirectly by his workmen.
- C. Pipe and duct openings shall be closed with caps or plugs during installation. Prior to startup, check to see that all temporary covers have been removed.

- D. Equipment shall be tightly covered and protected against dirt, water and chemical or mechanical injury.
- E. At the completion of all work, the equipment shall be thoroughly cleaned and delivered in a condition satisfactory to the Owner.

PART 3 EXECUTION

3.1 EXCAVATING AND BACKFILLING:

- A. All excavating and backfilling shall be done by this Contractor except as noted on plans. Trenching shall be done as shown on the Drawings and according to the Plumbing Code.
 - 1. Curb cuts, asphalt, and concrete patching, etc., shall be part of this Contractor's responsibility. No extra payment will be made for rock excavation. Trenches for all underground piping shall be excavated to the required depths. The bottoms of trenches shall be tamped hard and graded to secure maximum fall. Bell holes shall be excavated to assure the pipe is resting for its entire length on solid ground. Should rock be encountered, it shall be excavated to a depth of 6" below the bottom of the pipe, and before laying the pipe, the space between the bottom of the pipe, and the rock surface shall be filled with gravel, thoroughly. Pipe laid in trenches dug in fill, shall be supported down to load bearing undisturbed soil. After the pipes have been tested and inspected, the trenches shall be filled. No roots, rocks or foreign materials of any description shall be used in backfilling the trenches. All surplus materials shall be hauled from the project by the Contractor at his expense.
- B. Backfilling shall be done in 6" layers to 18" above piping, tamping each layer to protect piping from damage.
- C. Backfilling shall be completed to 95% compaction under building and within 5 feet of the building line and 90% elsewhere.

3.2 CUTTING AND REPAIRING:

- A. Responsibility of the Contractor whose work is involved is to coordinate with others to prevent unnecessary cutting and repairing. Lay out and locate equipment, openings, and chases. Install sleeves, inserts, and supports. Arrange with those whose work is involved to do cutting and replacing caused by negligence or error with costs reimbursed by the Contractor at fault. Cutting and replacing of the existing work shall be the responsibility of the Contractor whose work is being installed. Removal or terminating connections of existing work which is abandoned or replaced shall also be done hereunder to provide correct and finished work.

3.3 LUBRICATION:

- A. Provide all oil for the operation of all equipment until acceptance and provide a chart listing the type of oil to be used for each piece of equipment.

- B. Properly lubricate all bearings and shafts during the installation. This contractor shall be held responsible for all damage to bearings while the equipment is being operated by him up to the date of acceptance of the equipment.
- C. All motors and other equipment shall be provided with covers as required for protection during construction.

3.4 OPERATING AND MAINTENANCE INSTRUCTIONS:

- A. Operations and Maintenance Manuals shall be submitted as required by Division One and these Specifications.
- B. All Operating Manuals shall be given to the Architect.

3.5 GUARANTEE:

- A. All equipment, materials and workmanship to be furnished and performed under this Contract shall be guaranteed for a period of one (1) year, commencing from the written notice of substantial completion approved by the Architect.
- B. All equipment and material warranties shall be honored in accordance with the manufacturer's guarantee and warranties required and set forth in the construction documents.
- C. The Contractor shall, upon notification by the Owner, during that period correct any such defects without cost to the Owner.

3.6 HVAC TEST AND BALANCE:

- A. All air and/or water systems, as appropriate, shall be tested and balanced to achieve flow at all outlets and inlets within 10% of the value shown on the drawings.
- B. Any deviations from such shall be brought to the attention of the Engineer previous to report submittal.
- C. Pulleys, motors, dampers, control devices, etc. shall be adjusted, if necessary, to provide proper flow.
- D. Grilles, registers and diffusers shall be adjusted for proper throw, drop, and spread to maintain draftless, comfortable conditions.
- E. All equipment shall be tested and proved free from defects and in good operating condition.
- F. System shall be tested for every mode of operation, summer through winter cycles.
- G. All tools, measuring devices and specialty equipment necessary shall be provided by Contractor.
- H. Two (2) weeks prior to the final inspection, Contractor shall submit to Architect four typewritten or hand lettered, bound copies of system performance report. Report shall include: building name; date performed; instruments used in testing; duct and/or pipe layouts, as appropriate, with all test points identified; air quantities and temperatures shown; rated and actual motor amperages; and a discussion of any deficiencies or deviations from the system specified, along with recommendations for correction.
- I. Contractor shall certify all information contained in this report as complete and correct as of the date of job completion.

3.7 FOUNDATION:

- A. All equipment shall be provided with suitable foundations and supports. It shall be the responsibility of this Contractor to provide for the proper locations of these foundations and supports. This applies to all rooftop equipment also. All concrete foundations required by equipment furnished by the Contractor shall be constructed by them (except where otherwise noted) in conformance with the recommendations of the manufacturer of the respective equipment, and with the approval of the Architect. All corners of the foundations shall be neatly chamfered. Foundation bolts shall be placed in the forms when the concrete is poured. Allow 1" below the equipment base for alignment, leveling and grouting with nonshrinking grout. Grouting shall be done after the equipment is leveled in place. After the grout has hardened, the foundation bolts shall be pulled up tight and the equipment shimmed, if necessary. After removal of the forms, the surface of the foundation shall be rubbed. Unless otherwise noted, foundations shall be a minimum of 6" high. All concrete work performed by these contractors shall conform entirely to the requirements of the Concrete Specifications which describe this class of work.

3.8 FLASHING:

- A. The Contractor shall be responsible for providing and installing all counterflashing. All openings in the roof shall be flashed and counterflashed. Use 4-pound per square foot lead flashing materials for all vent lines and welded flashing in steel lines passing through roof.

3.9 ACCESS PANELS:

- A. Similar to Milcor, size as required for concealed expansion joints, valves, traps, balancing dampers, equipment, and similar items requiring accessibility. Notify the General Contractor of each access panel location and the required size. Panels shall be proper type for ceiling or wall in which they are installed. The panels shall be furnished under this section of the Specifications, but shall be coordinated to be compatible with walls and ceilings furnished under other sections.

END OF SECTION

SECTION 23 0553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Pipe markers.
- D. Ceiling tacks.

1.2 RELATED REQUIREMENTS

- A. Section 09 9123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2015.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.4 SUBMITTALS

- A. See Section 01 3300 - Submittal Procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Air Terminal Units: Tags.
- C. Variable Refrigerant Flow Indoor Units: Tags.
- D. Variable Refrigerant Flow Outdoor Units: Nameplates.
- E. Automatic Controls: Tags. Key to control schematic.
- F. Control Panels: Nameplates.
- G. Dampers: Ceiling tacks, where located above lay-in ceiling.
- H. Ductwork: Nameplates.
- I. Heat Transfer Equipment: Nameplates.
- J. Instrumentation: Tags.
- K. Major Control Components: Nameplates.

- L. Piping: Pipe markers.
- M. Relays: Tags.
- N. Small-sized Equipment: Tags.
- O. Tanks: Nameplates.
- P. Thermostats: Nameplates.
- Q. Valves: Tags and ceiling tacks where located above lay-in ceiling.
- R. Water Treatment Devices: Nameplates.

2.2 NAMEPLATES

- A. Description: Laminated three-layer plastic with engraved letters.
 - 1. Letter Color: White.
 - 2. Letter Height: 1/4 inch (6 mm).
 - 3. Background Color: Black.
 - 4. Plastic: Comply with ASTM D709.

2.3 TAGS

- A. Plastic Tags: Laminated three-layer plastic with engraved white letters on dark contrasting background color. Tag size minimum 1-1/2 inch (40 mm) diameter.
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch (40 mm) diameter with smooth edges.

2.4 PIPE MARKERS

- A. Color: Comply with ASME A13.1.
- B. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- C. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- D. Underground Plastic Pipe Markers: Bright-colored continuously printed plastic ribbon tape, minimum 6 inches (150 mm) wide by 4 mil, 0.004 inch (0.10 mm) thick, manufactured for direct burial service.
- E. Ensure each refrigerant pipe also include identification to what VRF unit, branch selector or outdoor condenser to which it is connected in addition to the flow arrows and service.
- F. Color code as follows:
 - 1. Heating, Cooling, and Boiler Feedwater: Green with white letters.

2.5 CEILING TACKS

- A. Description: Steel with 3/4 inch (20 mm) diameter color coded head.
- B. Color code as follows:
 - 1. HVAC Equipment: Yellow.
 - 2. Fire Dampers and Smoke Dampers: Red.

3. Heating/Cooling Valves: Blue.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- E. Install underground plastic pipe markers 6 to 8 inches (150 to 200 mm) below finished grade, directly above buried pipe.
- F. Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
- G. Identify control panels and major control components outside panels with plastic nameplates.
- H. Identify thermostats relating to VRF units, terminal boxes or valves with nameplates.
- I. Identify valves in main and branch piping with tags.
- J. Identify air terminal units and radiator valves with numbered tags.
- K. Tag automatic controls, instruments, and relays. Key to control schematic.
- L. Identify piping, concealed or exposed, with plastic tape pipe markers. Use tags on piping 3/4 inch (20 mm) diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
 - 1. Ensure each refrigerant pipe also include identification to what VRF unit, branch selector or outdoor condenser to which it is connected in addition to the flow arrows and service.
- M. Install ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.
- N. On all equipment requiring routine operations, identify simple operation procedures with plastic nameplates.

- O. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

SECTION 23 0593
HVAC TESTING, ADJUSTING, AND BALANCING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of refrigerating systems.
- C. Measurement of final operating condition of HVAC systems.
- D. Commissioning activities.

1.2 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008 (Reaffirmed 2017).
- C. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, with Errata (2017).
- D. TABB (TAB) - HVAC Systems Testing, Adjusting, and Balancing; Sheet Metal and Air Conditioning Standards, Testing, Adjusting and Balancing Bureau; 2006.
- E. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

1.3 GENERAL

- A. Testing, Adjusting and Balancing shall be procured by the Owner. All information contained within this section is the responsibility of the Owner-awarded TAB Contractor.

1.4 SUBMITTALS

- A. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Submit to Engineer.
 - 2. Submit to the Commissioning Authority.
 - 3. Submit six weeks prior to starting the testing, adjusting, and balancing work.
 - 4. Include certification that the plan developer has reviewed Contract Documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.
 - 5. Include at least the following in the plan:
 - a. Preface: An explanation of the intended use of the control system.

- b. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - c. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - d. Identification and types of measurement instruments to be used and their most recent calibration date.
 - e. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - f. Final test report forms to be used.
 - g. Detailed step-by-step procedures for TAB work for each system and issue, including:
 - 1) Terminal flow calibration (for each terminal type).
 - 2) Diffuser proportioning.
 - 3) Branch/submain proportioning.
 - 4) Total flow calculations.
 - 5) Rechecking.
 - 6) Diversity issues.
 - h. Confirmation of understanding of the outside air ventilation criteria under all conditions.
 - i. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
 - j. Method of checking building static and exhaust fan and/or relief damper capacity.
 - k. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.
- D. Progress Reports.
- E. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- 1. Submit to the the Commissioning Authority within two weeks after completion of testing, adjusting, and balancing.
 - 2. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 3. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 - 4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 6. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

7. Test Reports: Indicate data on AABC MN-1 forms, forms prepared following ASHRAE Std 111, TABB, or NEBB forms.
8. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Engineer.
 - h. Project Contractor.
 - i. Project altitude.
 - j. Report date.

1.5 QUALITY ASSURANCE

- A. Perform total system balance in accordance with AABC MN-1, ASHRAE Std 111, TABB or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.
- B. TAB Agency Qualifications: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years documented experience certified by the TABB.
- C. Perform Work under supervision of TABB Certified Test and Balance Engineer experienced in performance of this Work and licensed at the Rio Rancho, New Mexico.

1.6 PRE-BALANCING MEETING

- A. Convene a meeting one week prior to commencing work of this Section.

1.7 SEQUENCING AND SCHEDULING

- A. Sequence work to commence after completion of systems and schedule completion of work before Substantial Completion of Project.

PART 2 EXECUTION

2.1 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 1. AABC (NSTSB), AABC National Standards for Total System Balance.
 2. TABB HVAC Testing, Adjusting and Balancing International Standards
 3. SMACNA (TAB).
 4. Maintain at least one copy of the standard to be used at project site at all times.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
 - 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 - 2. Having minimum of three years documented experience.
 - 3. Certified by one of the following:
 - a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
 - b. TABB, The Testing, Adjusting, and Balancing Bureau of National Energy Management Institute: www.tabbcertified.org/#sle.
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

2.2 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage is minimized.
 - 12. Proper strainer baskets are clean and in place.
 - 13. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

2.3 PREPARATION

- A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
 - 1. Require attendance by all installers whose work will be tested, adjusted, or balanced.
- B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.
- C. Provide additional balancing devices as required.

2.4 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

2.5 RECORDING AND ADJUSTING

- A. Field Logs: Maintain written logs including:
 - 1. Running log of events and issues.
 - 2. Discrepancies, deficient or uncompleted work by others.
 - 3. Contract interpretation requests.
 - 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.
- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
- G. Check and adjust systems approximately six months after final acceptance and submit report.

2.6 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Measure air quantities at air inlets and outlets.
- C. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- D. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- E. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- F. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- G. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

- H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- I. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- J. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.

2.7 SCOPE

- A. Test, adjust, and balance the following:
 - 1. Packaged Air Conditioning Units
 - 2. Make-up Air Handling Units
 - 3. Split Units (Indoor and Outdoor)
 - 4. Air Inlets and Outlets.

2.8 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
 - 1. Manufacturer.
 - 2. Model/Frame.
 - 3. HP/BHP.
 - 4. Phase, voltage, amperage; nameplate, actual, no load.
 - 5. RPM.
 - 6. Service factor.
 - 7. Sheave Make/Size/Bore.
- B. V-Belt Drives:
 - 1. Identification/location.
 - 2. Required driven RPM.
 - 3. Driven sheave, diameter and RPM.
 - 4. Belt, size and quantity.
 - 5. Motor sheave diameter and RPM.
- C. Combustion Equipment:
 - 1. Manufacturer.
 - 2. Model number.
 - 3. Firing rate.
 - 4. Gas pressure at meter outlet.
 - 5. Gas flow rate.
 - 6. Heat input.
 - 7. Ambient temperature.
 - 8. Heat output.
- D. Air Cooled Condensers:
 - 1. Identification/number.

2. Location.
 3. Manufacturer.
 4. Model number.
 5. Serial number.
 6. Entering DB air temperature, design and actual.
 7. Leaving DB air temperature, design and actual.
 8. Number of compressors.
- E. Air Moving Equipment:
1. Location.
 2. Manufacturer.
 3. Model number.
 4. Serial number.
 5. Arrangement/Class/Discharge.
 6. Air flow, specified and actual.
 7. Return air flow, specified and actual.
 8. Outside air flow, specified and actual.
 9. Total static pressure (total external), specified and actual.
 10. Inlet pressure.
 11. Discharge pressure.
 12. Sheave Make/Size/Bore.
 13. Number of Belts/Make/Size.
 14. Fan RPM.
- F. Return Air/Outside Air:
1. Identification/location.
 2. Design air flow.
 3. Actual air flow.
 4. Design return air flow.
 5. Actual return air flow.
 6. Design outside air flow.
 7. Actual outside air flow.
 8. Return air temperature.
 9. Outside air temperature.
 10. Actual mixed air temperature.
 11. Design outside/return air ratio.
 12. Actual outside/return air ratio.
- G. Exhaust Fans:
1. Location.
 2. Manufacturer.
 3. Model number.
 4. Air flow, specified and actual.
 5. Total static pressure (total external), specified and actual.
 6. Inlet pressure.
 7. Discharge pressure.
 8. Sheave Make/Size/Bore.

9. Number of Belts/Make/Size.
 10. Fan RPM.
- H. Air Monitoring Stations:
1. Identification/location.
 2. System.
 3. Size.
 4. Area.
 5. Design velocity.
 6. Design air flow.
 7. Test velocity.
 8. Test air flow.
- I. Indoor VRF Data:
1. Manufacturer.
 2. Type, (ductless/ducted/cassette/high-wall)
 3. Identification/number.
 4. Location.
 5. Model number.
 6. Size.
 7. Maximum design air flow.
 8. Maximum actual air flow.
 9. LAT (Heating and Cooling)
- J. Air Distribution Tests:
1. Room number/location.
 2. Diffuser/Register Type.
 3. Diffuser/Register Size.
 4. Design air flow.
 5. Test (final) velocity.
 6. Test (final) air flow.
 7. Percent of design air flow.

END OF SECTION

SECTION 23 0713
DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct insulation.
- B. Duct liner.
- C. Spiral duct insulation.
- D. Jacketing and accessories.

1.2 REFERENCE STANDARDS

- A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021.
- B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- F. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation; 2020.
- G. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2019.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- J. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- K. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.
- L. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- B. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

- A. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. 'K' ('Ksi') value: 0.25 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C518.
 - 2. Maximum Water Vapor Absorption: 5.0 percent by weight.
- B. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch (0.029 ng/(Pa s m)), when tested in accordance with ASTM E96/E96M.
 - 3. Secure with pressure-sensitive tape.
- C. Vapor Barrier Tape:
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

2.3 GLASS FIBER, RIGID

- A. Insulation: ASTM C612; rigid, noncombustible blanket.
 - 1. K (Ksi) Value: 0.24 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C518.
 - 2. Maximum Service Temperature: 450 degrees F (232 degrees C).

3. Maximum Water Vapor Absorption: 5.0 percent.
- B. Vapor Barrier Jacket:
 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 2. Secure with pressure-sensitive tape.
- C. Vapor Barrier Tape:
 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.

2.4 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
 1. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
 2. Maximum Service Temperature: 180 degrees F (82 degrees C).
 3. Connection: Waterproof vapor barrier adhesive.
- B. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

2.5 JACKETING AND ACCESSORIES

- A. Aluminum Jacket:
 1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch (0.41 mm) with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
 2. Thickness: 0.016 inch (0.40 mm) sheet.
 3. Finish: Embossed.
 4. Joining: Longitudinal slip joints and 2 inch (50 mm) laps.
 5. Fittings: 0.016 inch (0.40 mm) thick die-shaped fitting covers with factory-attached protective liner.
 6. Metal Jacket Bands: 3/8 inch (10 mm) wide; 0.015 inch (0.38 mm) thick aluminum.

2.6 DUCT LINER

- A. Elastomeric Foam Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
 1. Minimum Service Temperature: Minus 40 degrees F (Minus 40 degrees C).
 2. Maximum Service Temperature: 180 degrees F (82 degrees C).
 3. Fungal Resistance: No growth when tested according to ASTM G21.
 4. Apparent Thermal Conductivity: Maximum of 0.28 at 75 degrees F (0.045 at 24 degrees C).
 5. Minimum Noise Reduction Coefficients:
 - a. 1 inch (25 mm) Thickness: 0.40.
 - b. 1-1/2 inches (40 mm) Thickness: 0.50.
 6. Erosion Resistance: Does not show evidence of breaking away, flaking off, or delamination at velocities of 10,000 fpm (50.8 m/s) when tested in accordance with ASTM C1071.
 7. Connection: Waterproof vapor barrier adhesive.

- B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation. Comply with ASTM C916.
- C. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Ducts Conveying Air Below Ambient Temperature:
 - 1. Provide insulation with vapor barrier jackets.
 - 2. Finish with tape and vapor barrier jacket.
 - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 - 4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Insulated Ducts Conveying Air Above Ambient Temperature:
 - 1. Provide with standard vapor barrier jacket.
 - 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- E. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces: Finish with aluminum jacket.
- F. Interior, exposed round ductwork shall be spiral duct with interior insulation and perforated liner. Provide paint grip finish for field painting.
- G. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.
- H. Aluminum Jackets: Provide aluminum jackets on all duct installed outdoors, exposed or in high traffic areas. Coordinate with the facilities manager for determining these locations.
- I. External Duct Insulation Application:
 - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2. Secure insulation without vapor barrier with staples, tape, or wires.
 - 3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.

5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
- J. Duct Liner Application:
1. Adhere insulation with adhesive for 90 percent coverage.
 2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
 3. Seal and smooth joints. Seal and coat transverse joints.
 4. Duct dimensions indicated are net inside dimensions required for air-flow. Increase duct size to allow for insulation thickness.

END OF SECTION

SECTION 23 3100
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ducts.
- B. Flexible ducts.

1.2 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2019a.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2019b.
- E. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- G. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2018.
- H. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2017.
- I. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.
- J. SMACNA (FGD) - Fibrous Glass Duct Construction Standards; 2003.
- K. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines; 2001.
- L. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012.
- M. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.
- N. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.
- O. UL 1978 - Grease Ducts; Current Edition, Including All Revisions.
- P. UL 2221 - Tests of Fire Resistive Grease Duct Enclosure Assemblies; Current Edition, Including All Revisions.

1.3 PERFORMANCE REQUIREMENTS

- A. No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.4 SUBMITTALS

- A. Product Data: Provide data for duct materials and duct connections.
- B. Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.
- C. Manufacturer's Certificate: Certify that installation of glass fiber ductwork meets or exceed specified requirements.
- D. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of documented experience.

1.6 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B. Provide metal duct unless otherwise indicated. Fibrous glass duct can be substituted at the Contractor's option.
- C. Duct Shape and Material in accordance with Allowed Static Pressure Range:
 - 1. Round: Plus or minus 2 in-wc (500 Pa) of galvanized steel.
 - 2. Rectangular: Plus or minus 1/2 in-wc (125 Pa) of galvanized steel.
 - 3. Flexible Duct (Fabric and wire): Plus or minus 1/2 in-wc (125 Pa); see Section 23 3700.
- D. Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
 - a. Supply Air: 1/2 in-wc (125 Pa) pressure class, galvanized steel.

- b. Outside Air Intake: 1/2 in-wc (125 Pa) pressure class, galvanized steel.
 - c. Return and Relief Air: 1/2 in-wc (125 Pa) pressure class, galvanized steel.
 - d. General Exhaust Air: 1/2 in-wc (125 Pa) pressure class, galvanized steel.
 - e. Transfer-air and Sound Booths: 1/2 in-wc (125 Pa) pressure class, fibrous glass.
- E. Duct Fabrication Requirements:
- 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
 - 2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
 - 3. Construct tee's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
 - 4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
 - 5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
 - 6. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
 - 7. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.2 MATERIALS

- A. Flexible Ducts:
- 1. Two ply vinyl film supported by helically wound spring steel wire.
 - a. Pressure Rating: 10 inches WG (2.50 kPa) positive and 1.0 inches WG (250 Pa) negative.
 - b. Maximum Velocity: 4000 fpm (20.3 m/sec).
 - c. Temperature Range: -10 degrees F to 160 degrees F (-23 degrees C to 71 degrees C).
- B. Insulated Flexible Ducts:
- 1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.
 - a. Pressure Rating: 10 inches WG (2.50 kPa) positive and 1.0 inches WG (250 Pa) negative.
 - b. Maximum Velocity: 4000 fpm (20.3 m/sec).
 - c. Temperature Range: -20 degrees F to 210 degrees F (-28 degrees C to 99 degrees C).
- C. Low Pressure Supply (Heating Systems): 1 inch w.g. (250 Pa) pressure class, galvanized steel.
- D. Low Pressure Supply (System with Cooling Coils): 1 inch w.g. (250 Pa) pressure class, galvanized steel.

- E. Medium and High Pressure Supply: 2 inch w.g. (500 Pa) pressure class, galvanized steel.
- F. Return and Relief: 1 inch w.g. (250 Pa) pressure class, galvanized steel.
- G. General Exhaust: 1 inch w.g. (250 Pa) pressure class, galvanized steel.
- H. Kitchen Cooking Hood Exhaust: 1 inch w.g. (250 Pa) pressure class, galvanized steel.
- I. Outside Air Intake: 1 inch w.g. (250 Pa) pressure class, galvanized steel.

2.3 DUCTWORK FABRICATION

- A. T's, bends, and elbows: Construct according to SMACNA (DCS).
- B. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

2.4 METAL DUCTS

- A. Material Requirements:
 - 1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- B. Rectangular Metal Duct:
 - 1. Rectangular Double Wall Insulated: Rectangular spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.
 - a. Insulation:
 - 1) Thickness: 1 inch (25 mm).
 - 2) Material: Air.
- C. Round Metal Ducts:
 - 1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall.
 - 2. Round Double Wall Insulated Duct: Round spiral lock seam duct with galvanized steel outer wall, perforated galvanized steel inner wall; fitting with the solid inner wall.
 - a. Insulation:
 - 1) Thickness: 1 inch (25 mm).
 - 2) Material: Air.
 - 3. Round Connection System: Interlocking duct connection system per SMACNA (DCS).
- D. Round Spiral Duct. Interior ex:
 - 1. Round spiral lock seam duct with galvanized steel outer wall.
- E. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- F. Double Wall Insulated Round Ducts: Round spiral lockseam duct with galvanized steel outer wall, 1 inch (25 mm) thick fiberglass insulation, perforated galvanized steel inner wall; fitting with solid inner wall. Provide paint grip finish.

2.5 FLEXIBLE DUCTS

A. Flexible Air Ducts:

1. UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound spring steel wire.
2. Insulation: Fiberglass insulation with polyethylene vapor barrier film.
3. Pressure Rating: From 10 in-wc (2.5 kPa) positive to 1 in-wc (250 Pa) negative.
4. Maximum Velocity: 4,000 fpm (20.3 m/s).
5. Temperature Range: Minus 20 to 210 degrees F (Minus 28 to 99 degrees C).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install products following the manufacturer's instructions.
- C. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
- D. Flexible Ducts: Connect to metal ducts with adhesive.
- E. Duct sizes indicated are inside precise dimensions. For lined ducts, maintain sizes inside lining.
- F. Install and seal metal and flexible ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- G. Provide openings in ductwork as indicated to accommodate thermometers and controllers. Provide pilot tube openings as indicated for testing of systems, complete with metal can with spring device or screw to insure against air leakage. For openings, insulate ductwork and install insulation material inside a metal ring.
- H. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- I. Use double nuts and lock washers on threaded rod supports.
- J. Connect terminal units to supply ducts directly or with one foot (300 mm) maximum length of flexible duct. Do not use a flexible duct to change direction.
- K. Connect diffusers or light troffer boots to low-pressure ducts directly or with 5 feet (1.5 m) maximum length of flexible duct held in place with strap or clamp.
- L. Connect flexible ducts to metal ducts with metal draw bands.
- M. Use stainless steel for biohazardous or soiled utility exhaust duct.
- N. Use stainless steel for ductwork exposed to view and stainless steel or carbon steel for ducts where concealed.
- O. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- P. At exterior wall louvers, seal duct to louver frame and install blank-out panels.
- Q. Louver Fit-out:

1. Provide blank-out panels sealing available area of wall-mounted exterior-faced louver when connected ductwork is smaller than actual louver free area, and duct outlet is smaller than the louver frame.
 2. Use the same duct material painted black on the exterior side, then seal louver frame and duct.
- R. Duct Accessories, Terminal Units, Inlets, and Outlets: Interconnect as indicated in Sections 23 3300, 23 3600, and 23 3700.
- S. Duct Insulation: Provide duct insulation in compliance with Section 23 0713.
- T. Painting: Provide surface finish as indicated on drawings and Sections 09 9113 and 09 9123.

3.2 CLEANING

- A. Clean thoroughly each duct system as indicated within Section 23 0130.51.
- B. Clean the duct system and force air at high velocity through the duct to remove accumulated dust. Clean half the system at a time to obtain sufficient air. Protect equipment that could be harmed by excessive dirt with temporary filters or bypass during cleaning.

END OF SECTION

SECTION 23 3300
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Duct access doors.
- C. Duct test holes.
- D. Flexible duct connectors.
- E. Volume control dampers.
- F. Miscellaneous products:
 - 1. Duct opening closure film.

1.2 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.
- C. UL 33 - Safety Heat Responsive Links for Fire-Protection Service; Current Edition, Including All Revisions.
- D. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.
- E. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide for shop fabricated assemblies including volume control dampers and duct access doors. Include electrical characteristics and connection requirements.
- B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers and duct access doors.
- C. Manufacturer's Installation Instructions: Provide instructions for fire dampers.
- D. Project Record Drawings: Record actual locations of access doors and fire dampers.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements for additional provisions.
 - 2. Extra Fusible Links: One of each type and size.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with radius blades attached to pivoting frame and bracket, aluminum construction, with push-pull operator strap.

2.2 DUCT ACCESS DOORS

- A. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch (25 mm) thick insulation with sheet metal cover. Access panels shall match the fire / smoke rating of the ceiling or wall they are installed in.
 - 1. Less Than 12 inches (300 mm) Square: Secure with sash locks.
 - 2. Up to 18 inches (450 mm) Square: Provide two hinges and two sash locks.
 - 3. Up to 24 x 48 inches (600 x 1200 mm): Three hinges and two compression latches with outside and inside handles.
- B. Access doors with sheet metal screw fasteners are not acceptable.

2.3 FLEXIBLE DUCT CONNECTORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
 - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd (1.0 kg/sq m).
 - 2. Metal: 3 inches (75 mm) wide, 24 gauge, 0.0239 inch (0.61 mm) thick galvanized steel.

2.4 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Splitter Dampers:
 - 1. Material: Same gage as duct to 24 inches (600 mm) size in either direction, and two gages heavier for sizes over 24 inches (600 mm).
 - 2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
 - 3. Operator: Minimum 1/4 inch (6 mm) diameter rod in self aligning, universal joint action, flanged bushing with set screw .
- C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch (150 x 760 mm).

- D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch (200 x 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

2.5 MISCELLANEOUS PRODUCTS

- A. Duct Opening Closure Film: Mold-resistant, self-adhesive film to keep debris out of ducts during construction.
 - 1. Thickness: 2 mils (0.6 mm).
 - 2. High tack water based adhesive.
 - 3. UV stable light blue color.
 - 4. Elongation Before Break: 325 percent, minimum.

PART 3 EXECUTION

3.1 PREPARATION

- A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 23 3100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch (200 x 200 mm) size for hand access, 18 x 18 inch (450 x 450 mm) size for shoulder access, and as indicated. Provide 4 x 4 inch (100 x 100 mm) for balancing dampers only. Review locations prior to fabrication. Coordinate with other trades.
- D. Demonstrate re-setting of fire dampers to Owner's representative.
- E. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- F. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- G. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- H. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.
- I. Provide sun shields over any flexible connections installed outdoors.

END OF SECTION

SECTION 23 3423
HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cabinet exhaust fans.

1.2 RELATED REQUIREMENTS

- A. Section 23 3300 - Air Duct Accessories: Backdraft dampers.
- B. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B. AMCA 99 - Standards Handbook; 2016.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005.
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.
- E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
- F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.
- G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- H. UL 705 - Power Ventilators; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate the installation of exhaust fans with size, location and installation of service utilities.
- B. Sequencing: Ensure that utility connections are completed in an orderly and expeditious manner.

1.5 SUBMITTALS

- A. Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- B. Manufacturer's Instructions: Indicate installation instructions.
- C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.7 FIELD CONDITIONS

- A. Request Owner permission to use permanent ventilator(s) for ventilation during construction.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Greenheck: www.greenheck.com.
- B. Loren Cook Company: www.lorencook.com.
- C. PennBarry: www.pennbarry.com.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.2 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: Comply with AMCA 204.
- B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.
- D. Fabrication: Comply with AMCA 99.
- E. UL Compliance: UL 705, listed, labeled, designed, manufactured, and tested.
- F. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- G. Enclosed Safety Switches: Comply with NEMA 250.

2.3 CABINET EXHAUST FANS

- A. Centrifugal Fan Unit: V-belt or direct driven with galvanized steel housing lined with acoustic insulation, resiliently mounted motor, gravity backdraft damper in discharge.
- B. Disconnect Switch: Cord and plug-in housing for thermal overload protected motor and wall mounted switch.
- C. Grille: Molded white plastic.
- D. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.
- E. See plans for additional requirements.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide sheaves required for final air balance.
- C. Provide backdraft dampers on outlet from cabinet and ceiling exhausters fans.
- D. Provide with exterior wall exhaust cap & pest screen.

END OF SECTION

SECTION 23 3700
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rectangular ceiling diffusers.
- B. Registers/grilles:
 - 1. Ceiling-mounted, exhaust and return register/grilles.
 - 2. Ceiling-mounted, supply register/grilles.
 - 3. Wall-mounted, supply register/grilles.
- C. Duct-mounted supply and return registers/louvers.

1.2 REFERENCE STANDARDS

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.
- B. ARI 890 - Standard for Air Diffusers and Air Diffuser Assemblies; Air-Conditioning and Refrigeration Institute; 2008.
- C. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (Reaffirmed 2011).
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.
- E. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005.

1.3 SUBMITTALS

- A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.
- B. Project Record Documents: Record actual locations of air outlets and inlets.

1.4 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Test and rate louver performance in accordance with AMCA 500-L.
- C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Krueger: www.krueger-hvac.com/#sle.
- B. Price Industries: www.price-hvac.com/#sle.

- C. Ruskin Company; www.ruskin.com/#sle.
- D. Titus, a brand of Air Distribution Technologies; www.titus-hvac.com/#sle.

2.2 RECTANGULAR CEILING DIFFUSERS

- A. Type: Provide square, adjustable pattern, stamped, multi-core and diffuser to discharge air in four way pattern.
- B. Connections: As indicated on drawings. Provide square-to-round adapters where needed.
- C. Frame: Provide surface mount for gypsum board ceilings.
- D. Fabrication: Aluminum with baked enamel finish.
- E. Frame: Surface mount and/or T-bar lay-in type.
- F. Color: As selected by Architect from manufacturer's standard range.
- G. Accessories: Provide radial opposed blade volume control damper; multi-louvered equalizing grid with damper adjustable from diffuser face.
- H. Fabrication: Aluminum with baked enamel architect-approved finish.
- I. Accessories: Radial opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.3 DUCT-MOUNTED SUPPLY AND RETURN REGISTERS/LOUVERS

- A. Manufacturers:
 - 1. Krueger-HVAC; DMD: www.krueger-hvac.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Type: Duct-mounted, rectangular louver for round 2" vane spacing with adjustable blades, end caps, built-in volume damper,. Performance to match manufacturer's catalog data.
- C. Color: As selected by Architect from manufacturer's standard range.

2.4 CEILING SUPPLY REGISTERS/GRILLES

- A. Manufacturers:
 - 1. Krueger-HVAC; 51450: www.krueger-hvac.com/#sle.
- B. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, two-way deflection.
- C. Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting and gasket.
- D. Construction: Made of aluminum extrusions with factory enamel finish.
- E. Color: As selected by Architect from manufacturer's standard range.
- F. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.5 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

- A. Manufacturers:
 - 1. Krueger-HVAC; EGC5: www.krueger-hvac.com/#sle.

- 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Type: Egg crate style face consisting of 1/2 x 1/2 x 1/2 inch (13 x 13 x 13 mm), 1/2 x 1/2 x 1 inch (13 x 13 x 25 mm), and 1 x 1 x 1 inch (25 x 25 x 25 mm) grid core
- C. Fabrication: Grid core consists of aluminum with mill aluminum finish.
- D. Color: To be selected by Architect from manufacturer's standard range.
- E. Frame: 1-1/4 inch (32 mm) margin with countersunk screw mounting.
- F. Frame: Channel lay-in frame for suspended grid ceilings.
- G. Plenum: Provide a galvanized steel, insulated boot with each return air plenum grille.

2.6 WALL SUPPLY REGISTERS/GRILLES

- A. Manufacturers:
 - 1. Krueger-HVAC; 5880; www.krueger-hvac.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Type: Streamlined and individually adjustable blades, 3/4 inch (19 mm) minimum depth, 3/4 inch (19 mm) maximum spacing with spring or other device to set blades, vertical face, single deflection.
- C. Fabrication: Steel with 20 gauge, 0.0359 inch (0.91 mm) minimum frames and 22 gauge, 0.0299 inch (0.76 mm) minimum blades, steel and aluminum with 20 gauge, 0.0359 inch (0.91 mm) minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D. Color: To be selected by Architect from manufacturer's standard range.
- E. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.
- C. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- D. Install diffusers to ductwork with air tight connection.
- E. Provide balancing dampers on duct take-off to diffusers, and grilles and registers.
- F. Paint ductwork visible behind air outlets and inlets matte black.
- G. Provide integral opposed blade dampers on all diffusers, registers and exhaust grilles regardless if duct-mounted balancing dampers are installed.

END OF SECTION

SECTION 23 7416
PACKAGED ROOFTOP HEAT PUMP AIR-CONDITIONING UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Packaged, intermediate-capacity, rooftop air-conditioning units.

1.2 REFERENCE STANDARDS

- A. AHRI 270 - Sound Performance Rating of Outdoor Unitary Equipment; 2015.
- B. AMCA 611 - Certified Ratings Program for Airflow Measurement Stations; 2015.
- C. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

- A. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- B. Shop Drawings: Indicate capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- D. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from physical damage by storing off site until roof mounting curbs are in place and ready for immediate installation of units.

1.6 WARRANTY

- A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Carrier Corporation; www.commercial.carrier.com/#sle.
- B. Johnson Controls International, PLC; www.johnsoncontrols.com/#sle.
- C. Trane, a brand of Ingersoll Rand; www.trane.com/#sle.
- D. Daikin, www.daikin.com

2.2 PACKAGED, INTERMEDIATE-CAPACITY, ROOFTOP AIR-CONDITIONING UNITS

- A. General: Ground mounted heat pump units having electric refrigeration that are 7.5 tons to 25 tons in capacity.
- B. Description: Self-contained, packaged, factory assembled and prewired, consisting of cabinet and frame, supply fan, heat pump heating function, full DB economizer damper control, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.
- C. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.
- D. Disconnect Switch: Factory mount disconnect switch in control panel.

2.3 CASING

- A. Cabinet: Steel with baked enamel finish, including access doors with piano hinges and locking handle. Structural members to be minimum 18 gauge, 0.0478 inch (1.21 mm), with access doors or panels of minimum 20 gauge, 0.0359 inch (0.91 mm).
- B. Insulation: 1/2-inch (13 mm) thick, neoprene-coated glass fiber with edges protected from erosion.

2.4 FANS

- A. Supply and Exhaust Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, adjustable variable pitch pulley, and rubber isolated hinge mounted. Provide with high efficiency motor or direct drive as indicated. Isolate complete fan assembly. See Section 23 0548.

2.5 EVAPORATOR COIL

- A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.
- B. Provide capillary tubes or thermostatic expansion valves for units of 6 tons (21 kw) capacity and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons (26 kw) cooling capacity and larger.

2.6 CONDENSER COIL

- A. Provide copper tube aluminum fin coil assembly with subcooling rows and coil guard.
- B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor. Provide high efficiency fan motors.

- C. Provide refrigerant pressure switches to cycle condenser fans.

2.7 COMPRESSORS

- A. Provide hermetic compressors, 3600 rpm maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves and gauge ports, and filter drier.

2.8 MIXED AIR CASING

- A. Dampers: Provide outside, return, and relief dampers with damper operator and control package to automatically vary outside air quantity. Outside air damper to fall to closed position. Relief dampers may be gravity balanced.
- B. Gaskets: Provide tight fitting dampers with edge gaskets maximum leakage 5 percent at 2-inch (500 Pa) pressure differential.
- C. Damper Operator, Units 7.5 Ton (26 kW) Cooling Capacity and Larger: 24 volt with gear train sealed in oil with spring return on.

2.9 AIR FILTERS:

- A. 2-inch (50 mm) thick, glass fiber disposable media in metal frames.

2.11 OPERATING CONTROLS - SINGLE ZONE UNITS

- A. Electric solid state microcomputer-based room thermostat, located as indicated in service area with remote sensor located as indicated in service area with remote sensor.
- B. Room thermostat to incorporate:
 - 1. Automatic switching from heating to cooling.
 - 2. Preferential rate control to minimize overshoot and deviation from setpoint.
 - 3. Set up for four separate temperatures per day.
 - 4. Instant override of setpoint for continuous or timed period from one hour to 31 days.
 - 5. Short cycle protection.
 - 6. Programming based on weekdays, Saturday and Sunday.
 - 7. Switch selection features including imperial or metric display, 12- or 24-hour clock, keyboard disable, remote sensor, fan on-auto.
 - 8. Humidity sensor and unit control.
- C. Room thermostat display to include:
 - 1. Actual room temperature.
 - 2. Programmed temperature.
 - 3. Programmed time.
 - 4. Duration of timed override.
 - 5. Time of day.
 - 6. Day of week.
 - 7. System model indication: heating, cooling, auto, off, fan auto, fan on.
 - 8. Stage heating or cooling operation.
 - 9. Relative Humidity.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that roof is ready to receive work and opening dimensions are as required by manufacturer.
- B. Verify that proper power supply is available.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.3 SYSTEM STARTUP

- A. Prepare and start equipment. Adjust for proper operation.

END OF SECTION

SECTION 23 8126.13
SMALL-CAPACITY SPLIT-SYSTEM HEAT PUMP AIR CONDITIONERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air-source heat pumps.
- B. Indoor air handling (fan and coil) units for ducted systems.
- C. Controls.

1.2 REFERENCE STANDARDS

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.
- B. AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.
- C. ASHRAE Std 23.1 - Methods for Performance Testing Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Pressures of the Refrigerant; 2019.
- D. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- E. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2018.
- F. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
- B. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.
- C. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.
- D. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Filters: One for each unit.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience and approved by manufacturer.

1.5 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide three year manufacturers warranty for solid state ignition modules.
- C. Provide five year manufacturers warranty for heat exchangers.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Carrier Corporation; www.carrier.com.
- B. Trane Inc; www.trane.com.
- C. Daikin; www.daikin.com.

2.2 SYSTEM DESIGN

- A. Split-System Heat Pump Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
 - 1. Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator.
 - 2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.
- B. Performance Requirements: See Drawings for additional requirements.
 - 1. Efficiency:
 - a. Seasonal Energy Efficiency Ratio: 14.0, minimum.
 - b. Energy Efficiency Ratio: 12

2.3 INDOOR AIR HANDLING UNITS FOR DUCTED SYSTEMS

- A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coil, and heating and cooling controls; wired for single power connection with control transformer.
- B. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
 - 1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
 - 2. Manufacturer: System manufacturer.

2.4 OUTDOOR UNITS

- A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
 - 1. Refrigerant: R-410A or code acceptable refrigerant.

2. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
 3. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23.1 and UL 207.
- B. Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.
 - C. Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gauge ports, thermometer well (in liquid line).
 1. Provide thermostatic expansion valves.
 - D. Operating Controls:
 1. Control by room thermostat to maintain room temperature setting.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
- B. Verify that proper power supply is available and in correct location.
- C. Verify that proper fuel supply is available for connection.

3.2 INSTALLATION

- A. Install in accordance with NFPA 90A and NFPA 90B.

END OF SECTION

SECTION 26 0500

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general electrical requirements, and specific requirements on supports and electrical metering.

1.2 REFERENCES

- A. Applicable parts of the following industry codes and standards and references shall be considered an integral part of this section. Unless otherwise noted, the latest edition of codes and standards in effect at the time of purchase shall be followed.
 - 1. ASTM International (ASTM)
 - a. ASTM A36/A36M – Standard Specification for Carbon Structural Steel
 - b. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 - c. ASTM B221 – Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 - d. ASTM D635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
 - e. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
 - f. ASTM F3125/F3125M – Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
 - 2. Institute of Electrical and Electronic Engineers (IEEE)
 - a. IEEE C2 – National Electrical Safety Code (NESC)
 - 3. National Electrical Manufacturers Association (NEMA)
 - a. NEMA 250 – Enclosures for Electrical Equipment (1,000V Maximum)
 - 4. National Fire Protection Association (NFPA)
 - a. NFPA 70 – National Electrical Code (NEC)
 - 5. Underwriters Laboratories (UL)

1.3 SUBMITTALS

- A. Product Data: Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of electrical support component used
- B. Shop Drawings:
 - 1. Descriptive information that states conformance to codes, recognized testing, or manufacturing standards.
 - 2. Manufacturer's name and catalog cuts listing type, model number, catalog number, materials, styles, and finish.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- D. Review submittals for equipment furnished under other Sections prior to installation and electrical rough-in. Verify location, size, and type of connections. Coordinate details of equipment connections with supplier and installer.

- E. Contractor shall note any deviations from the requirements of the contract plans and specifications.
- F. Requirements specified in other specification sections.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories shall be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction such as Underwriters Laboratories, Inc., and marked for intended use.
- B. Perform Work in accordance with the current edition of the National Electrical Code (NEC) and the National Electrical Safety Code (NESC).
- C. Perform Work in accordance with local ordinances, codes and statutes.
- D. Work shown and specified in these Contract Documents establishes the minimum standard of construction. Comply with any additional requirements of the codes or local requirements.

1.5 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow:
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Coordinate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Comply with the requirements of the NEC.
- D. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

1.6 ELECTRICAL SERVICE

- A. Coordinate with the local electric utility company, Evergy.
 - 1. Coordinate reconnection of service with utility.

1.7 ELECTRICAL SERVICE LABELING

- A. Service equipment shall be labeled per NEC 110.24 (A) for actual calculated short circuit and date of calculation with a nameplate as described in SECTION "Electrical Identification".

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

- A. Continuous Slot Channel (Strut) Steel Support Systems: Comply with Metal Framing Manufacturers Association Standard MFMA-4, factory-fabricated components for field assembly.
 - 1. Finishes:
 - a. Hot-dip galvanized: Hot-dip galvanized after fabrication and applied according to MFMA-4.

- b. Electro-galvanized: Electroplated coating of zinc after fabrication and applied according to MFMA-4.
 - c. Pre-galvanized: Hot dip galvanized prior to fabrication applied according to MFMA-4.
 - d. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - e. Epoxy Coatings: Strut and fittings shall be painted with water born epoxy according to MFMA-4.
 - f. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 - 3. Fitting and Accessory Materials: Same as channels and angles.
 - 4. Channel Dimensions: Selected for structural loading.
 - 5. Rated Strength: Selected to suit structural loading.
- B. Continuous Slot Channel (Strut) Stainless Steel Support Systems: Comply with Metal Framing Manufacturers Association Standard MFMA-4. Provide 304 stainless steel factory-fabricated components ready for field assembly.
- 1. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 - 2. Fitting and Accessory Materials: Same as channels and angles.
 - 3. Channel Dimensions: Selected for structural loading.
 - 4. Rated Strength: Selected to suit structural loading.
- C. Continuous Slot Channel (Strut) Aluminum Support Systems: Comply with Metal Framing Manufacturers Association Standard MFMA-4. Channel material shall meet ASTM B221 specifications. Provide factory-fabricated components ready for field assembly.
- 1. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 - 2. Fitting and Accessory Materials: ASTM B209.
 - 3. Channel Dimensions: Selected for structural loading.
 - 4. Rated Strength: Selected to suit structural loading.
- D. Nonmetallic Slot Channel (Strut) Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels. Material shall be a vinyl ester resin with a UV resistant surface treatment, and shall ASTM E84, Class 1 Flame Rating and self-extinguishing requirements of ASTM D635.
- 1. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
 - 2. Fitting and Accessory Materials: Same as channels and angles.
 - 3. Channel Dimensions: Selected for structural loading.
 - 4. Rated Strength: Selected to suit structural loading.
- E. End caps. Provide end caps on all channels. End caps shall be gray, PVC plastic, manufactured for the specific size of channel furnished.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following requirements.
- 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel as required in Part 3 of this specification, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
3. Through Bolts: Structural type, hex head, high strength. Comply with ASTM F3125/F3125M.
4. Toggle Bolts: All-steel springhead type.
5. Hanger Rods: Threaded steel.

2.2 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICAL METERING

- A. Current-Transformer Cabinets: Comply with requirements of electrical power utility company.
- B. Meter Sockets: Comply with requirements of electrical power utility company.
- C. Service Equipment: Provide electric service entrance equipment certified to conform to EUSERC (Electric Utility Service Equipment Requirements Committee) standards.

2.3 CONDUCTORS IN VERTICAL CONDUIT

- A. Support for Conductors in Vertical Conduit: Provide a factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

2.4 EQUIPMENT ENCLOSURES

- A. Do not install equipment in a more severe environment than recommended by the equipment manufacturer. When not indicated, provide enclosures suitable for the environment in which they are located in accordance with NEMA 250.

2.5 DISCONNECT MEANS

- A. Provide each motor with a disconnecting means where required by the NEC.

2.6 DEVICE CONNECTIONS

- A. Provide suitable lugs or connectors to accommodate line and load side conductors shown on the Drawings. Where available device connections are inadequate for the number and/or size of conductors required, provide bus extensions, adapter plates or power distribution blocks as required.

2.7 CONCRETE BASES AND HOUSEKEEPING PADS

- A. Concrete: Minimum of 3000-psi (20.7-MPa), 28-day compressive strength.

2.8 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

2.9 FIRESTOPPING

- A. Firestopping materials shall meet the requirements of Division 7 – Firestopping.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

- A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.
- B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- D. Motors: Install motors per manufacturer's instructions. Verify line voltage and phase of power source with the motor nameplate data before wiring the motor. Prior to checking the direction of motor rotation, decouple equipment (eg. pump, fan, valve) from the motor shaft. Verify that the direction of motor rotation and the equipment are the same and re-couple the motor shaft and equipment.
- E. Working clearance. Provide working clearance as required by the NEC.
- F. Dedicated space. Provide dedicated space for electrical equipment as required by the NEC.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

- A. Damp or Wet Locations and Outdoors: Provide hot dip galvanized steel slot (strut) channel, aluminum channel, or stainless steel (Type 304 or 316) channel. Provide stainless steel anchor bolts.
- B. Indoor, Dry Locations: Provide pre-galvanized or electro-galvanized steel slot (strut) channel.
- C. Manholes: Provide nonmetallic slot (strut) channel. Provide concrete insert type or stainless steel anchor bolts.
- D. Do not attach aluminum channel directly to concrete. Provide plastic spacers or coat surfaces in contact with concrete with epoxy paint.
- E. For channel attached to aluminum handrails or other aluminum structures, provide aluminum or stainless steel channels with stainless steel hardware.
- F. Provide stainless steel anchor bolts for stainless steel channels.
- G. Field Cuts: Grind all edges smooth, make cuts square unless angles are required for installation. Paint field cuts of galvanized steel channel with a galvanizing solution or zinc rich paint.

3.3 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
 - 1. Do not fasten supports to piping, ceiling support wires, ductwork, mechanical equipment, or conduit.
 - 2. Install surface-mounted cabinets and panelboards with minimum of four anchors.
 - 3. Provide metal channel supports to stand cabinets and conduit one inch off wall in wet locations.
 - 4. Bridge studs top and bottom with channels to support flush-mounted cabinets and panelboards in stud walls.

- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install 1/4-inch- (6-mm-) diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1-1/2-inch (38-mm) and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports. Do not use spring steel fasteners in damp, wet or corrosive locations.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.
- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches (610 mm) from the box.
- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- M. Securely fasten electrical items and their supports to the building structure per the following requirements, unless otherwise indicated. Perform fastening according to the following requirements unless other fastening methods are indicated. Verify with manufacturer the suitability of fasteners in subparagraphs below for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick. Fasteners which fracture or damage surfaces are not acceptable.
 - 1. Wood: Fasten with wood screws or screw-type nails.
 - 2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
 - 3. New Concrete: Concrete inserts with machine screws and bolts.
 - 4. Existing Concrete: Expansion bolts.
 - 5. Instead of expansion bolts, threaded studs driven by a powder charge and provided with lock washers may be used.
 - 6. Steel: Welded threaded studs or spring-tension clamps on steel.
 - 7. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
 - 8. Light Steel: Sheet-metal screws.
 - 9. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.4 CONDUCTORS IN VERTICAL CONDUIT

- A. Provide support for conductors in vertical conduit where required by Article 300 of the NEC.

3.5 UTILITY COMPANY ELECTRICAL-METERING EQUIPMENT

- A. Install equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.6 FIRESTOPPING

- A. Apply U.L. listed firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. See architectural drawings for locations of fire rated floors, walls, ceilings and partitions.

3.7 CONCRETE HOUSEKEEPING PADS

- A. Install all freestanding electrical and control equipment on 4-inch high concrete pads (top 4 inches above finished floor). Arrange components in the electrical equipment so that any switch operating handle is not more than 6 feet 7 inches above the surrounding floor to comply with NEC 404.8.
- B. Construct concrete housekeeping pads of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so expansion anchors will be a minimum of 10 bolt diameters from edge of the base.

3.8 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.
- C. Abandoned Work: Remove all abandoned wiring. In exposed locations, cut and remove buried raceway 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish. In concealed locations, cut raceways flush with surface. Plug or cap raceways.
- D. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.9 EXISTING ELECTRICAL WORK

- A. Verify that abandoned wiring and equipment serve only abandoned facilities.
- B. Disconnect existing electrical systems in walls, floors, and ceilings indicated for removal.
- C. Existing Receptacle and Lighting circuits and devices which are not scheduled for demolition, but which are inadvertently affected by demolition activities, will be restored to full function.
- D. Existing Motors: Re-circuit existing motors as indicated on the plans. Verify line voltage and phase of power source with the motor nameplate data before wiring the motor. Prior to checking the direction of motor rotation, decouple equipment (eg. pump, fan, valve) from the motor shaft. Verify that the direction of motor rotation and the equipment are the same and re-couple the motor shaft and equipment.

- E. Coordinate utility service outages and reconnections with Utility Company and Owner.
- F. Provide temporary wiring and connections to maintain existing systems in service during construction.
- G. Remove, relocate, and repair existing installations to accommodate new construction.
 - 1. Remove abandoned wiring to source of supply.
 - 2. Remove exposed abandoned conduit and boxes including abandoned conduit above accessible ceiling finishes.
 - 3. Disconnect abandoned outlets and remove devices.
 - 4. Provide blank cover for abandoned outlets which are not removed.
 - 5. Disconnect and remove abandoned panelboards and distribution equipment.
 - 6. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
 - 7. Disconnect and remove abandoned luminaires, brackets, stems, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during removal of existing electrical work.
- I. Maintain access to existing, active electrical installations.
- J. Clean and repair existing materials and equipment which remain or are to be reused.
 - 1. Panelboards: Clean and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Revise circuit directory.
 - 2. Luminaires: Clean exterior and interior surfaces.
- K. Extend existing installations using materials and methods compatible with existing electrical installations, and as specified.

3.10 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.11 REFINISHING AND TOUCHUP PAINTING

- A. Refinish and touch up painting:
 - 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 - 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 - 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.12 CLEANING AND PROTECTION

- A. On completion of installation, inspect and clean all electrical equipment and enclosures including panelboard, switchboard, transformer, motor control center, control panel and electrical enclosure interiors, light fixtures and lenses, outlet boxes, floor mounted devices, fittings, and wiring devices. Remove burrs, dirt, paint spots, and construction debris.

- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 26 0519

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.2 REFERENCES

- A. Applicable parts of the following industry codes and standards and references shall be considered an integral part of this section. Unless otherwise noted, the latest edition of codes and standards in effect at the time of purchase shall be followed.
 - 1. ASTM International (ASTM)
 - a. ASTM B3 – Standard Specification for Soft or Annealed Copper Wire
 - b. ASTM B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
 - c. ASTM B33 – Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purpose
 - 2. National Electrical Manufacturers Association (NEMA)
 - a. NEMA WC70 – Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
 - 3. National Fire Protection Association (NFPA)
 - a. NFPA 70 – National Electrical Code (NEC)
 - 4. Underwriters Laboratories (UL)
 - a. UL 44 – Thermoset-Insulated Wires and Cables
 - b. UL 83 – Thermoplastic-Insulated Wires and Cables
 - c. UL 486A-486B – Wire Connectors
 - d. UL 486C – Splicing Wire Connectors
 - e. UL 486D – Sealed Wire Connector Systems
 - f. UL 719 – Nonmetallic-Sheathed Cables
 - g. UL 854 – Service-Entrance Cables
 - h. UL 1277 – Electrical Power and Control Tray Cable
 - i. UL 1569 – Metal-Clad Cables

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Each cable and the outside of each reel or coil, must be plainly marked or tagged to indicate the cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- B. Each coil or reel of cable must contain only one continuous cable without splices.
- C. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors and Cables Installed in Cable Tray: Listed and labeled as suitable for cable tray use. Cables shall be in accordance with NEC Article 336. NM or NMC conductors shall not be used in cable tray.
- H. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.
- I. Cord Drops and Portable Appliance Connections: Type SO, hard service cord.
- J. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, uncoated copper conductors complying with ASTM B3 or ASTM B8, unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.
 - 4. Solid Conductor: 10 AWG and smaller.
 - 5. Stranded Conductor: 8 AWG and larger.
- K. Minimum Conductor Size:
 - 1. Power and Lighting Circuits: 12 AWG.
 - 2. 120-volt Control and Alarm Circuits: 14 AWG.
 - 3. Current Transformer Secondary Circuits: 10 AWG.
 - 4. Potential Transformer, Relaying, and Control Circuits: 14 AWG.
- L. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by NFPA 70. Maintain consistent color coding throughout the project.
 - 2. Color Code:

- a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown
 - 2) Phase B: Orange
 - 3) Phase C: Yellow
 - 4) Neutral/Ground: Gray
- b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black
 - 2) Phase B: Red
 - 3) Phase C: Blue
 - 4) Neutral/Ground: White
- c. 240/120 V, 1 Phase, 3 Wire System
 - 1) Phase A: Black
 - 2) Phase B: Red
 - 3) Neutral/Ground: White
- d. Equipment Ground, All Systems: Green.
- e. Isolated Ground, All Systems: Green with yellow stripe.
- f. DC Systems:
 - 1) Positive: Red
 - 2) Negative: Black

2.2 SINGLE CONDUCTOR WIRE

- A. Description: Single conductor insulated wire for above grade and interior location feeders, branch circuits and field wired control circuits operating at 120 volts or greater.
- B. Insulation Voltage Rating: 600 V.
- C. Insulation: THWN/THHN or THHN/THWN-2.

2.3 NONMETALLIC-SHEATHED CABLE: TYPES NM AND NMC

- A. Description: NFPA 70, Type NM multiple-conductor cable listed and labeled as complying with UL 719.
- B. Insulation Voltage Rating: 600 V.
- C. Insulation: THWN or THHN.
- D. Cable Jacket: PVC.
- E. Provide fittings suitable for and compatible with the type of cable used. Fittings need to secure the cable against pull out or rotation.

2.4 SERVICE ENTRANCE CABLE: TYPE USE

- A. Service Entrance Cable for Underground Use: NFPA 70, Type USE single-conductor cable listed and labeled as complying with UL 854, Type USE-2, with UL 44, Type RHH/RHW-2 and with VW-1 flame testing. For installations requiring gas and oil resistance, comply with UL 44.
- B. Insulation Voltage Rating: 600 V.
- C. Insulation: Crosslinked polyethylene.

2.5 METAL-CLAD CABLE: TYPE MC

- A. Description: Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569.
- B. Insulation Voltage Rating: 600 V.
- C. Insulation type shall be as follows:
 - 1. For industrial applications: Cross-linked polyethylene or ethylene propylene rubber.
 - 2. Commercial applications: PVC.
- D. Grounding: A stranded copper ground wire shall be present in the cable interstice(s).
- E. Metal covering over the conductors shall be interlocking armor, galvanized steel or aluminum.
- F. Provide PVC jacket over cable armor.
- G. Provide fittings suitable for and compatible with the type of cable used. Fittings need to secure the cable against pull out or rotation.

2.6 POWER AND CONTROL TRAY CABLE: TYPE TC

- A. Description: NFPA 70, Type TC cable listed and labeled as complying with UL 1277.
- B. Insulation Voltage Rating: 600 V.
- C. Insulation Type: XHHW or XHHW-2.
- D. Grounding: Full-size integral equipment grounding conductor.
- E. Jacket: PVC or Chlorinated Polyethylene (CPE).

2.7 VARIABLE FREQUENCY DRIVE CABLE

- A. Description: Flexible motor supply cable listed and labeled as complying with UL 2277 in accordance with NFPA 79; specifically designed for use with variable frequency drives and associated nonlinear power distortions.
- B. Conductor Stranding: Stranded.
- C. Insulation Voltage Rating: 1000 V.
- D. Insulation: Use only thermoset insulation types; thermoplastic insulation types are not permitted.
- E. Grounding: Full-size integral equipment grounding conductor or symmetrical arrangement of multiple conductors of equivalent size.
- F. Provide metallic shielding.
- G. Jacket: PVC or Chlorinated Polyethylene (CPE).

2.8 INSTRUMENTATION WIRING

- A. Milliamp Direct Current Circuits for Electronic Instrumentation: Each conductor shall be No. 18 AWG minimum, 7-strand copper with minimum 15-mil high-density polyethylene or equivalent insulation on each conductor. Cables shall be single twisted pairs or multiple twisted pairs each with a shield, and an overall jacket of 20-mil PVC minimum on single-pair cable and 45-mils PVC minimum on multi-pair cables. Shield shall be a laminated tape of aluminum and polyester film. Provide a tinned copper drain wire in contact with the shield along the length of the cable. Provide Belden No. 8760 (18 gauge) or equal.

2.9 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated. Connectors and splices shall be listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connections:
 - 1. Soldered connections are not acceptable.
 - 2. Push-in connectors are not acceptable.
 - 3. Indoor dry locations for No. 10 AWG wire and smaller: Provide solderless twist-on connectors listed to UL 486C - Ideal "Wire Nuts," 3M "Scotchlok," or equal.
 - 4. Indoor dry locations for No. 8 AWG wire and larger: Provide solderless connectors such as hydraulically crimped type or split bolts - Burndy, O.Z., Penn-Union or equal. Uninsulated joints shall be taped over with plastic tape, 3M "Scotch Brand" No. 33 Plus or equal, to provide an insulation value greater than or equal to that on the wire.
 - 5. Indoor dry locations in junction boxes or wireways: Power distribution blocks consisting of a single block of tin plated aluminum alloy mounted to an insulating base. The block shall be provided with conductor openings and set screws. Provide with insulated covers. The power distribution block shall be secured to the enclosure. Provide Ilsco PDB series or equal.
 - 6. Damp locations for No. 8 AWG wire and smaller: Provide solderless twist-on connections, factory pre-filled with silicone sealant listed to UL 486C and UL 486D – Ideal "WeatherProof" or equal.
 - 7. Wet and below grade locations (including below grade pullboxes and manholes) for No. 8 AWG and smaller: Provide solderless twist-on connections, factory pre-filled with silicone sealant listed to UL 486C and UL 486D for direct burial – Ideal "Underground" or equal.

2.10 TERMINATIONS

- A. Compression type solderless lugs shall be tin plated cast copper and UL listed for the application. Terminal lugs shall have a temperature rating that is equal or greater than that of the wire and terminal equipment.

PART 3 - EXECUTION

3.1 CONDUCTOR DERATING

- A. Conductors shown on the drawings are based on no more than three current carrying conductors in a raceway. If the Contractor chooses to combine homeruns resulting in more than three current carrying conductors in a raceway then the Contractor shall apply the NEC derating factors for more than three current carrying conductors in a raceway

3.2 EXAMINATION

- A. Verify that work likely to damage wire and cable has been completed.

- B. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

3.3 INSTALLATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.
- B. Cables, wires, or conductors shall be installed in compliance with applicable requirements of NEC, NEMA, and UL and in accordance with recognized industry practices. Cables not installed in conduits shall be concealed in finished walls, ceilings, and floors, unless otherwise indicated.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.
- E. Secure and support conductors and cables in accordance with NFPA 70. Do not provide support from raceways, piping, ductwork, or other systems.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Terminations: Terminate stranded wire at screw terminals with compression type lugs. Terminations made by looping stranded wire around a terminal screw are not acceptable.
- C. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

3.5 MC CABLE INSTALLATION

- A. Type MC cable shall only be used in the following locations:
 - 1. For 120 volt and 277 volt, 15- and 20-ampere lighting and receptacle circuits within a particular room or space. Homerun circuit from the room or space shall be installed in conduit.
 - 2. For 120 volt and 277 volt, 15- and 20-ampere light fixture "whips" from a junction box to a light fixture.
 - 3. For "fishing" circuits through inaccessible spaces in existing construction.
- B. Do not install PVC jacketed cables in plenums or spaces used for environmental air.

3.6 NM CABLE INSTALLATION

- A. Type NM cable shall only be used in the following locations:
 - 1. Where allowed by the NEC and local codes.
 - 2. In concealed locations only.
- B. Do not install in plenums or spaces used for environmental air.

3.7 TESTS

- A. General: Test all conductors of each feeder or circuit rated 50 amperes and larger by applying 500 volts direct-current to the conductor with a megohm meter (megger). Conduct test after conductor is pulled and spliced, but prior to connection to any transformers, switchgear, switchboards, motor control centers, starters, capacitors, surge arresters, motors or any other equipment.
- B. Procedure: Test in accordance with the megohm meter manufacturer's instructions.
- C. Test Equipment: Provide megohm meter, test personnel, and all other equipment required to perform the tests. Resident Project Representative and/or Owner shall witness each test.
- D. Damage During Testing: Conduct test in accordance with test equipment manufacturer's instructions. Replace any conductor, materials, or equipment damaged during testing.
- E. Test Results: Provide test results that include the following information as a minimum:
 - 1. Date
 - 2. Names of testing personnel.
 - 3. Test procedures used.
 - 4. Conductor designation including circuit and phase.
 - 5. Conductor description.
 - 6. Temperature at time of test.
 - 7. Megohm reading.
 - 8. Brand, model number, and serial number of test equipment.
 - 9. Meter calibration report indicating valid and current NIST certification.
 - 10. Signature of testing personnel.
 - 11. Signature of witness.
- F. Review of Test Results: Architect/Engineer shall review all test results. Megohm values of less than 20 megohms are not acceptable. Replace any unacceptable conductors or splices and test the conductor when repairs are complete.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

1.2 REFERENCES

- A. Applicable parts of the following industry codes and standards and references shall be considered an integral part of this section. Unless otherwise noted, the latest edition of codes and standards in effect at the time of purchase shall be followed.
 - 1. ASTM International (ASTM)
 - a. ASTM B3 – Standard Specification for Soft or Annealed Copper Wire
 - a. ASTM B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
 - 2. Institute of Electrical and Electronics Engineers (IEEE)
 - a. IEEE 837 – Standard for Qualifying Permanent Connections Used in Substation Grounding
 - b. IEEE C2 – National Electrical Safety Code (NESC)
 - 3. National Electrical Manufacturers Association (NEMA)
 - a. NEMA GR 1 – Grounding Rod Electrodes and Ground Rod Electrode Couplings
 - 4. National Fire Protection Association (NFPA)
 - a. NFPA 70 – National Electrical Code (NEC)
 - b. NFPA 780 – Standard for the Installation of Lightning Protection Systems
 - 5. Underwriters Laboratories (UL)
 - a. UL 96 – ANSI/CAN/UL Standard for Lightning Protection Components
 - b. UL 467 – Grounding and Bonding Equipment
 - c. UL 486A-486B – Wire Connectors

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for ground rods, grounding conductors and cables, and connector products. The catalog pages and data sheets shall indicate the selected model and catalog numbers, materials, and conformance to codes, recognized testing or manufacturing standards.
- B. Field Test Reports: Submit written test reports to include the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
 - 4. Description of equipment used.
 - 5. Calibration certificates for equipment used.
 - 6. Personnel and their qualifications.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467.
- C. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- D. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING GENERAL REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.2 GROUNDING AND BONDING CONDUCTORS

- A. For insulated conductors, comply with Division 26 SECTION 26 0519 "Low Voltage Electrical Power Conductors and Cables".
- B. Material: Copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Stranded cable.
- F. Underground Conductors: Bare stranded soft drawn copper.
- G. Bare Copper Conductors: Comply with the following:
 - 1. For Solid Conductors: ASTM B3.
 - 2. For Assembly of Stranded Conductors: ASTM B8.
- H. Ground Conductor and Conductor Protector for Wood Poles:
 - 1. No. 4 AWG minimum, soft-drawn copper conductor.
 - 2. Conductor protector: Wood, use pressure-treated fir, or cypress or cedar.
- I. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.
- J. Protect exposed ground conductors in exterior locations to a height of 3'-0" minimum above grade with Schedule 40 PVC conduit or wood molding designed for the purpose.

2.3 CONNECTOR PRODUCTS

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. The following type of connectors may be used:
 - 1. Bolted pressure-type.
 - 2. Compression-type connectors, terminals and lugs shall be tin plated copper.
 - 3. Exothermic-welded type, in kit form, and selected per manufacturers written instructions.

2.4 GROUNDING RODS

- A. Comply with NEMA GR 1.
- B. Ground Rods: Copper-clad steel unless otherwise noted.
 - 1. Size: 3/4 by 120 inches (19 by 3000 mm).

2.5 GROUND WELLS

- A. Ground well. Where indicated, provide a concrete or plastic composite ground well with a minimum 10" diameter and a minimum 12" deep. Ground well and cover shall meet the live load requirements of AASHTO H-10. Cover shall have "Ground" stamped or cast on top surface. Provide a 6"x6" concrete, grade level collar around ground wells not installed in paved areas.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Use only copper conductors.
- B. In raceways, use insulated equipment grounding conductors.
- C. Direct Buried and Underground Connections: Use Exothermic-Welded Connections, except those at ground wells.
- D. Connections to Structural Steel: Use Exothermic-Welded connections or bolted pressure connections.
- E. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- F. Ground Rod Clamps at Ground Wells: Use bolted pressure clamps with at least two bolts.

3.2 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.
- B. Install equipment grounding conductors in all feeders and circuits.
- C. Isolated Grounding Receptacle Circuits: In addition to an equipment grounding conductor, install an insulated equipment grounding conductor connected to the receptacle's isolated grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

- D. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding rod in addition to installing a separate equipment grounding conductor with supply branch-circuit conductors.
 - E. Common Ground Bonding with Lightning Protection System: Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor.
- 3.3 SIGNAL AND COMMUNICATION SYSTEMS
- A. For telephone, alarm, voice and data, and other communication systems, provide No. 6 AWG minimum insulated grounding conductor from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
- 3.4 COUNTERPOISE
- A. Ground the steel framework of the building with a driven ground rod at the base of every corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart. Provide a grounding conductor (counterpoise), electrically connected to each ground rod and to each steel column, extending around the perimeter of the building. Use copper conductor sized as shown on drawings for counterpoise and for tap to building steel. Bury counterpoise not less than 30 inches (765 mm) below grade and 24 inches (600 mm) from building foundation. All buried connections shall be exothermic welded.
 - B. Connections to fence posts shall be bolted. Fence post grounds shall be connected after the fences are installed. Each gate shall be grounded with a flexible braid. Barbed wire shall be grounded with a No. 6 AWG copper conductor connected to the counterpoise conductor at the base of the fence post.
- 3.5 INSTALLATION
- A. Ground Rods: At exterior locations drive ground rods until tops are 12 inches (305 mm) below final grade, unless otherwise indicated. Where multiple ground rods are required to meet resistance requirements, install ground rods a minimum of 6 feet apart. Interconnect ground rods with grounding electrode conductors.
 - B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
 - C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.
 - D. Metal Water Service Pipe: Provide grounding electrode conductor from the building's grounded service conductor at the main electric service equipment to the buildings main metal water service entrance. Connect grounding electrode conductors to main metal water service pipe with grounding clamp connectors. Where a dielectric main water fitting is installed, do not connect grounding electrode conductor to the street side of the water service pipe. Bond interior metal water piping system as required by the NEC.
 - E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.
 - F. When grounding conductors are installed in metal conduit, bond conduit at each end to the grounding conductor.

- G. Bond interior metal piping systems, including above ground gas piping system as required by the NEC.

3.6 CONCRETE ENCASED ELECTRODE

- A. Concrete-Encased Grounding Electrode: Fabricate according to NFPA 70, Article 250. Bond grounding conductor to reinforcing steel with an exothermic weld or grounding clamps approved for the application in at least four locations. Connections to anchor bolts shall be made with bolted grounding clamps approved for the application. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

3.7 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or tinned materials.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Coat and seal connections having dissimilar metals with bituminous mastic or similar waterproofing material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturers written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable. Pull conductor and tap connection with a hammer to confirm a good weld. Molds shall be designed for the connection being made.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. If metallic raceways terminate at metal housings without an electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.
- H. Underground connections shall be UL listed for underground use.
- I. Twisting ground wires together as the only means of connection is not acceptable.

END OF SECTION

SECTION 26 0533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.2 REFERENCES

- A. Applicable parts of the following industry codes and standards and references shall be considered an integral part of this section. Unless otherwise noted, the latest edition of codes and standards in effect at the time of purchase shall be followed.
 - 1. American National Standards Institute (ANSI)
 - a. ANSI C80.1 – Electrical Rigid Steel Conduit
 - b. ANSI C80.5 – Electrical Rigid Metal Conduit
 - c. ANSI C80.6 – Electrical Intermediate Conduit
 - d. ANSI/SCTE 77 – Specifications for Underground Enclosure Integrity
 - 2. National Electrical Manufacturers Association (NEMA)
 - a. NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable
 - b. NEMA RN 1 – Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
 - c. NEMA TC 2 – Electrical Polyvinyl Chloride (PVC) Conduit
 - d. NEMA TC 3 – Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing
 - 3. National Fire Protection Association (NFPA)
 - a. NFPA 70 – National Electrical Code (NEC)
 - 4. Underwriters Laboratories (UL)
 - a. UL 1 – Flexible Metal Conduit
 - b. UL 360 – Liquid-Tight Flexible Metal Conduit
 - c. UL 514B – Conduit, Tubing, and Cable Fittings
 - d. UL 651A – Schedule 40 and 80 High Density Polyethylene (HDPE) Conduit
 - e. UL 1203 – Explosionproof and Dust-Ignitionproof Electrical Equipment for Use in Hazardous (Classified) Locations

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduit, surface raceways, wireways and fittings, cabinets and enclosures, floor boxes, boxes for hazardous (classified) locations, and underground boxes/enclosures. The catalog pages and data sheets shall indicate the selected model and catalog numbers, materials, styles, finish, and conformance to codes, recognized testing or manufacturing standards.
- B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Rigid Metal Conduit (RMC) – Galvanized Steel: Comply with ANSI C80.1.
- B. Rigid Metal Conduit (RMC) – Aluminum: Comply with ANSI C80.5.
- C. Intermediate Metal Conduit (IMC): Comply with ANSI C80.6.
- D. PVC-Coated Galvanized Steel Conduit and Fittings:
 - 1. Material: Conduit shall comply with NEMA RN1. Conduit shall be rigid galvanized steel coated on the exterior with PVC, 40 mils nominal thickness. Conduit interior shall be coated with urethane, 2 mils nominal thickness.
 - 2. Fittings shall conform to NEMA RN1 and shall have the same exterior and interior coatings as the conduit. Fittings shall be of the same manufacturer as the conduit.
 - 3. Pipe straps and other accessories shall be PVC coated. All threads shall be protected from corrosion. Anchor bolts and fasteners shall be stainless steel.
- E. Electrical Metallic Tubing (EMT) and Fittings: Comply with ANSI C80.3.
 - 1. Fittings: Compression type only. Hydraulically crimped or set screw connections are not acceptable.
- F. Flexible Metal Conduit (FMC): Zinc-coated steel complying with UL 1.
- G. Liquidtight Flexible Metal Conduit (LFMC): Flexible steel conduit with oil-proof PVC jacket complying with UL 360.
- H. Flexible Couplings (Hazardous Location): Couplings for connection to vibrating equipment shall be stainless steel. Couplings shall be rated Class I Division 1 & 2 Groups A,B,C,D; Class II Division 1 & 2 Groups E,F,G; Class III; and watertight.
- I. Fittings: Compatible with conduit and tubing materials.
 - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. Rigid Non-metallic Conduit (RNC): Comply with NEMA TC2, Schedule 40 and Schedule 80 PVC.
 - 1. Fittings: Comply with NEMA TC 3; match to conduit type and material.
- B. High Density Polyethylene (HDPE): Comply with UL 651A, Schedule 80. Couplings shall be pressure tight rated to 200 psi and suitable for direct burial.
- C. Electrical Nonmetallic Tubing (ENT) is not acceptable.

2.3 METAL WIREWAYS

- A. Material and Construction: Sheet metal sized and shaped as indicated. Indoor enclosures shall be rated NEMA 1 and outdoor or wet location enclosures shall be rated NEMA 3R unless otherwise indicated.
- B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.
- D. Wireway Covers: Screw-cover type.
- E. Finish: Manufacturer's standard enamel finish.

2.4 SURFACE RACEWAYS

- A. General: Raceway shall be compact, shaped like molding to blend with wall and ceiling construction. Provide surface raceway systems complete with fittings, boxes, adapters for use with existing boxes, and all accessories necessary for a complete and finished installation. Boxes shall be suitable for surface mounting at locations shown. Provide the manufacturers standard mounting straps, assemblies, covers, elbows, couplings, support clips, tee's and box connectors.
- B. Single Channel Metallic Surface Raceways: Steel with snap-on covers. Finish shall be manufacturer's standard finish and color. Base shall have a single wiring channel. The raceway and all system components (receptacles, cover plates, boxes, etc.) shall be UL Listed and provided from one manufacturer.
- C. Multi-Channel Metallic Surface Raceways: Steel with snap-on covers. Finish shall be manufacturer's standard finish and color. Base shall have 2 wiring channels separated by integral barriers. Barriers may be snapped out of the base to create one or two channels. The raceway and all system components (receptacles, cover plates, boxes, etc.) shall be UL Listed and provided from one manufacturer.

2.5 BOXES AND ENCLOSURES

- A. Enclosure ratings: Comply with NEMA 250.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: Shall not be used.
- E. Junction and Pull Boxes:
 - 1. Boxes less than 100 cubic inches: Comply with NEMA OS 1.

2. Boxes larger than 100 cubic inches: Comply with UL 50.
3. Screw covers shall be used unless otherwise indicated on drawings.

- F. Floor Boxes: Concrete Tight Stamped steel, fully adjustable, with 2separate power/data/communications service compartments minimum. Fully gasket door openings shall meet UL 514A scrub water exclusion test standards.
- G. Boxes for Hazardous (Classified) Locations: Listed and labeled as complying with UL 1203 for the classification of the installed location.
- H. Underground Boxes/Enclosures: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
1. Size: As indicated on drawings.
 2. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
 3. Provide logo on cover to indicate type of service.
 4. Applications:
 - a. Sidewalks and Landscaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum ANSI/SCTE 77, Tier 8 load rating.
 - b. Parking Lots, in Areas Subject Only To Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum ANSI/SCTE 77, Tier 15 load rating.

2.6 FACTORY FINISHES

- A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard <Insert color> paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

2.7 WEATHERPROOF HUBS

- A. Provide weatherproof hubs for any conduit entry on the top of all enclosures located in damp or wet locations.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. General: Use of any of the conduit types in accordance with NEC, Articles 342 through 360, is acceptable with the following exceptions.
1. EMT shall not be installed in concrete, in wet locations as defined by NEC, in wet locations as noted on the Drawings, or in direct contact with the earth.
 2. Nonmetallic conduit shall only be installed underground or encased within poured concrete structures. Nonmetallic conduit shall be adapted to the appropriate type of metal conduit before it emerges from concealment. All elbows shall be metallic.
- B. Outdoors, damp:
1. Exposed: RMC or IMC.
 2. Concealed: RMC or IMC.
 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 4. Boxes and Enclosures: NEMA 3R unless otherwise indicated.
- C. Outdoors, wet:
1. Exposed: RMC or IMC.
 2. Concealed: RMC or IMC.

3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 4. Boxes and Enclosures: NEMA 3R unless otherwise indicated.
- D. Indoors, dry:
1. Exposed: EMT.
 2. Concealed: EMT.
 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC.
 4. Connections to light fixtures above accessible ceilings: FMC.
 5. Boxes and Enclosures: Type 1 unless otherwise indicated.
- E. Indoors, damp:
1. Exposed: RMC or IMC.
 2. Concealed: RMC or IMC.
 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): use LFMC.
 4. Connections to light fixtures above accessible ceilings: FMC.
 5. Boxes and Enclosures: Type 4, unless otherwise indicated.
- F. Indoors, wet:
1. Exposed: RMC or IMC.
 2. Concealed: RMC or IMC.
 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): use LFMC.
 4. Connections to light fixtures above accessible ceilings: FMC.
 5. Boxes and Enclosures: Type 4, unless otherwise indicated.
- G. Conduits installed below floor slabs: Conduits shall be placed a minimum of 4 inches below the floor slab. Conduits shall have sufficient cover to prevent floating when concrete is poured.
1. Nonmetallic conduit shall conform to RNC Schedule 40 and shall be joined with solvent cement.
 2. Sufficiently cover or secure raceways to prevent sagging or shifting during concrete placement.
 3. Conduit shall be a minimum of 1-inch trade size.
 4. Nonmetallic conduit shall be adapted to the appropriate type of metal conduit before it emerges from concealment.
 5. Lateral spacing of conduits shall not be less than three conduit diameters.
- H. Conduit Penetrations: All conduits penetrating through floor slabs, concrete walls or grade shall be galvanized rigid steel with factory PVC coating or wrapped with PVC tape. Coating shall extend 2 inches minimum above slab or finished grade. PVC tape shall be 3M Scotchrap 50 (10 mils) or equal. Conduit shall be cleaned and painted with 3M Scotchrap pipe primer and tape shall be half-lapped to provide a minimum of 20 mils coating at any point on the conduit. Adapters from buried PVC conduit to galvanized rigid steel conduit shall be wrapped with PVC tape after assembly.
- I. Conduit Installed Underground (Exterior of Buildings) – Direct Buried:
1. Use: Only where indicated on the Drawings may conduits be installed direct buried on the exterior of building foundations.
 2. Material: PVC coated RGS or RNC Schedule 40. Nonmetallic conduit and fittings shall be joined by solvent cement.
 3. Size: 2-inch nominal size minimum.
 4. Depth: Top of conduit at 30 inches minimum below finished grade.
 5. Marking: Underground conduit routes shall be marked with tape printed with identification lettering as specified in “Electrical Identification”. Tape shall be buried 8 to 10 inches below the surface over the entire length of the conduit.

6. Tracing Wire: Provide a #14 AWG THWN or THHN tracing wire placed in the trench with the conduit. Route the wire through intermediate handholes. Route the wire to above grade at each end of the conduit run and coil at least 12 inches at an accessible location. Identify as "Trace Wire" with a tag or label.
7. Cleaning: All conduits including spares shall be cleaned. A mandrel, not less than 12 inches long and diameter of ½ inch less than the diameter of the conduit shall be pulled through the conduit. Following the mandrel, a brush with stiff bristles shall be pulled through the conduit to clean out debris. Blocked conduits shall be replaced.

J. Conduit Installed Underground (Exterior of Buildings) – Directional Bore:

1. Use: Where specifically noted on the drawings, provide conduit installed by directional bore.
2. Material: UL Listed SDR 13.5 HDPE. Nonmetallic conduit and fittings shall be joined by solvent cement. HDPE shall be joined with UL approved fittings.
3. Size: 2-inch nominal size minimum.
4. Depth: Top of conduit at 30 inches minimum below finished grade.

K. Minimum Raceway Size: 3/4-inch trade size (DN 21).

L. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. EMT: Use compression fittings only. Set screw fittings are not acceptable.

M. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

N. Do not install aluminum conduits embedded in or in contact with concrete or earth.

3.2 INSTALLATION

A. Keep raceways at least 8 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

B. Complete raceway installation before starting conductor installation.

C. Support raceways as specified in Division 26 SECTION 26 0500 "Basic Electrical Materials and Methods".

D. Install temporary closures to prevent foreign matter from entering raceways.

E. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

F. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

G. Conceal conduit within finished walls, ceilings, and floors, unless otherwise indicated.

1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.
2. Conduits in unfinished areas associated with exposed equipment, and raceways on open ceiling construction, may be installed exposed.

H. Install conduits exposed and boxes surface mounted unless otherwise specified or shown.

- I. Provide surface raceway systems for surface wiring in finished areas of existing construction where indicated.
- J. RMC and IMC: Support and securely fasten in place at intervals not to exceed 10'-0".
- K. EMT: Support and securely fasten in place at intervals not to exceed 5'-0".
- L. PVC Coated Conduit: Conduit system shall be installed in accordance with manufacturer's recommendations, and care shall be used to prevent damage to the coatings. Any damage to interior or exterior coatings shall be repaired with manufacturer-approved materials.
- M. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
 - 1. Run parallel or banked raceways together on common supports.
 - 2. When bending parallel conduits, all conduit bends shall have the same radius or concentric bends.
 - 3. Raceway installation shall not obstruct light fixtures, electrical equipment, and mechanical assemblies.
- N. Join raceways with fittings designed and approved for that purpose and make joints tight.
 - 1. Use insulating bushings to protect conductors.
- O. Terminations:
 - 1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
 - 2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
- P. Install pull lines in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull line and tie to a support so that the line cannot slip into conduit. [Provide labels with unique identifiers that match at each end of the conduit for all empty raceways.]
- Q. Telephone and Signal System Raceways, 2-Inch Trade Size (DN 53) and Smaller: In addition to above requirements, install indoor raceways in maximum lengths of 150 feet (45 m) and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.
- R. Install raceway-sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway-sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Hazardous locations or where otherwise required by NFPA 70.
- S. Stub-up connections: Stub-up conduits a minimum of 2" above floor or equipment pad of free standing equipment. Provide bushings on metallic conduit, and provide caps for spare conduits.
- T. All conduit stub-outs and sleeves for wiring not installed in raceways shall have bushings installed on the end of each conduit where not connected to a box or fitting. Bushings shall be securely fastened to the conduit and shall be threaded or hammer-on type.
- U. Flexible Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi-recessed lighting fixtures.

- V. Set floor boxes level and flush with finished floor surface.
 - W. Install hinged-cover enclosures and cabinets plumb. Support at each corner.
 - X. Fire Rated Penetrations: Where conductor raceways or cable trays penetrate fire rated wall or floor assemblies, openings shall be firestopped with UL listed sealants, barriers, or other devices specifically approved for the purpose.
 - Y. Temperature:
 - 1. Conduits exposed to changes in temperature or attached to structures that may expand or contract shall be provided with expansion fittings.
 - 2. Nonmetallic or PVC coated conduits shall not be installed in areas where the temperature may exceed 122 degrees F for extended periods of time.
 - Z. Provide raceway expansion joints where raceway crosses building and structural expansion joints.
- 3.3 PENETRATION SLEEVES
- A. Sleeves: Furnish sleeves for conduit passing through concrete walls, partitions, beams, floors and roof while same are under construction. A conduit sleeve shall be one size larger than the size of conduit which it serves except where sealing bushings are used in sleeves through walls below grade. Sleeves are not required for conduits installed before the wall, partition, floor, or roof is constructed.
 - B. Sleeves Set in Concrete Floor: Sleeves shall be 18-gauge galvanized steel or PVC. Sleeves shall extend 2 inches above the finished floor. Conduit passing through concrete or masonry walls shall have Schedule 40 galvanized steel sleeves. Sleeves shall be set flush with finished wall. If holes and sleeves are not properly installed and cutting and patching become necessary, it shall be done at no expense to Owner. Undertake no cutting or patching without first securing approval. Where penetrations must be waterproofed, properly caulk with oakum and run full of asphalt mastic or silicone rubber caulking.
 - C. Sleeves Penetrating Walls Below Grade: Sleeves shall be Schedule 40 black steel pipe with 1/4-inch thick steel plate secured to the pipe with continuous fillet weld or a factory made sealing fitting employing pressure rings and sealing grommet. The plate shall be located in the middle of the wall and shall be 1/4-inch wider all around than the sleeve which it encircles. The entire assembly shall be hot-dipped galvanized after fabrication.

3.4 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.5 CLEANING

- A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes. Match factory finish with same material and color.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes electrical identification materials and devices required to comply with IEEE C2, NFPA 70, OSHA standards, and authorities having jurisdiction, and to provide a clearly labeled, easy to operate and maintain system.
- B. A unique wire number shall be assigned to each control and alarm circuit conductor. Letter prefixes may be used. Markers displaying the wire number shall be securely attached to the conductor at all splices and at each and every connection to control panels, terminal strips, control stations, indicators, starters, contacts, sensors, relays and similar equipment.
- C. Items requiring nameplates are listed in part 3 of this section.
- D. Identification of each phase conductor of power and lighting circuits shall be accomplished by color-coding. The color assigned to a particular phase shall be consistent throughout the work.
- E. Power feeder circuits 100 amps and larger, 600V and below, and all medium voltage circuits shall be uniquely identified with a circuit number and the panel of origin.

1.2 REFERENCES

- A. Applicable parts of the following industry codes and standards and references shall be considered an integral part of this section. Unless otherwise noted, the latest edition of codes and standards in effect at the time of purchase shall be followed.
 - 1. American National Standards Institute (ANSI)
 - a. ANSI Z535.2 – Environmental and Facility Safety Signs
 - b. ANSI Z535.4 – Product Safety Signs and Labels
 - 2. Institute of Electrical and Electronics Engineers (IEEE)
 - a. IEEE C2 – National Electrical Safety Code (NESC)
 - 3. National Fire Protection Association (NFPA)
 - a. NFPA 70 – National Electrical Code (NEC)
 - b. NFPA 70E – Standard for Electrical Safety in the Workplace
 - 4. Underwriters Laboratories (UL)
 - a. UL 969 – Marking and Labeling Systems

1.3 SUBMITTALS

- A. Product Data: Submit manufacturers literature, part numbers, specification sheets, and installation instructions for each electrical identification product provided.
- B. Schedule: Submit a schedule of all wire numbers to be used for review by the Architect/Engineer. Do not install any markers prior to review and acceptance of the schedule by the Architect/Engineer. Schedule shall list the following information as a minimum:
 - 1. Wire Number
 - 2. Source device and physical location
 - 3. Destination device and physical location
 - 4. Conductor description including AWG and color

5. Signal description

- C. Schedule Changes: Keep complete record of changes and additions that occur during construction. Include the complete schedule in the Operation and Maintenance Data submittal.

1.4 QUALITY ASSURANCE

- A. Comply with IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with NFPA 70 for color-coding.

PART 2 - PRODUCTS

2.1 IDENTIFICATION FOR EQUIPMENT

- A. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components. Identify power source and circuit number for each piece of equipment. This applies to the following equipment:
1. Switchgear.
 2. Switchboards.
 3. Motor Control Centers.
 4. Panelboards: Include the following additional requirements.
 - a. Use typewritten circuit directory to identify load(s) served from the panelboard.
 5. Transformers.
 6. Enclosed switches, circuit breakers, and motor controllers.
 7. Busway.
 8. Transfer Switches: Include the following additional requirements.
 - a. Identify power source and circuit number for both normal power source and standby power source.
 - b. Identify short circuit current rating based on the specific overcurrent protective device type and settings protecting the transfer switch.
- B. Service Equipment:
1. Use identification nameplate to identify each service disconnecting means.
 2. For buildings or structures supplied by more than one service, or any combination of branch circuits, feeders, and services, use identification nameplate or means of identification acceptable to authority having jurisdiction at each service disconnecting means to identify all other services, feeders, and branch circuits supplying that building or structure. Verify format and descriptions with authority having jurisdiction.
- C. Emergency System Equipment:
1. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.
 2. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.
 3. Use identification nameplate to identify emergency operating instructions for emergency system equipment.
- D. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70, including but not limited to the following.
1. Service equipment.

2. Industrial control panels.
3. Motor control centers.
4. Elevator control panels.
5. Industrial machinery.

- E. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
1. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
 2. Service Equipment: Include the following information in accordance with NFPA 70.
 - a. Nominal system voltage.
 - b. Available fault current.
 - c. Clearing time of service overcurrent protective device(s).
 - d. Date label applied.

2.2 IDENTIFICATION NAMEPLATES AND SIGNS

- A. Safety Signs: Comply with IEEE C2, NFPA 70 and OSHA 1910.145.
- B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. in. (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.
1. Engraved legend with black letters on white face.
 2. Punched or drilled for mechanical fasteners.
- C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting.
- D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch (6.4-mm) grommets in corners for mounting.
- E. Provide stainless steel nameplates, 0.025-inch thick minimum, 1.5 inches across, square or round, with stamped lettering for field mounted measurement and control devices. Provide Seton Name Plate Company, New Haven, Connecticut Style 250-S, SVT-15-S, or equal.
- F. Lettering Size:
1. For panelboards, motor control centers, transformers, floor-mounted control panel, and switchboards: 0.75-inch high minimum.
 2. For enclosed circuit breakers, safety switches, manual motor starters, magnetic motor starters, lighting contactors, wall-mounted control panel, automatic transfer switches, variable frequency drives and cables in manholes or handholes: 0.5-inch high minimum.
 3. For device legend plates: 0.125-inch high minimum.
 4. For all other nameplates: 0.25-inch high minimum.

2.3 POWER CONDUCTORS

- A. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide (0.08 mm thick by 25 to 51 mm wide).

2.4 CONTROL AND ALARM CIRCUIT CONDUCTORS

- A. Markers: Provide markers with permanent numbering/lettering securely fastened to the conductor. Provide non-smearing and solvent resistant markers. Provide markers with typed or printed numbering, hand lettering is not acceptable. Provide markers of one of the following type(s):
 - 1. Heat Shrink Markers: Provide heat shrink markers made of white polyolefin tubing printed with black numbering. PVC tubing is not acceptable. Heat shrink the tubing with a flameless heat gun designed for the purpose. Provide Thomas & Betts series HVM or equal.
 - 2. Sleeve Markers: Provide sleeve markers made of white PVC with imprinted black numbering designed to slip over the conductor and grip when released. Provide markers that interlock to assure alignment of the numbers/letters. Clip-on type markers are not acceptable. Provide Thomas & Betts series SMS or equal.

2.5 UNDERGROUND WARNING TAPE

- A. Underground Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.
 - 1. Not less than 6 inches wide by 4 mils thick (152 mm wide by 0.102 mm thick).
 - 2. Compounded for permanent direct-burial service.
 - 3. Printed legend continuously repeated indicating type of underground service.
 - 4. Embedded continuous metallic strip or core.
 - 5. Color Code:
 - a. Tape for Buried Power Lines: Black text on red background.
 - b. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

2.6 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 - 1. Materials:
 - a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
 - b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
 - 2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
 - 3. Minimum Size: 7 by 10 inches unless otherwise indicated.
- C. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - a. Do not use labels designed to be completed using handwritten text.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Manufacturers nameplate shall remain attached to each piece of equipment or device. Do not obscure the manufacturer's nameplate with mounting hardware, paint or the device designation nameplate.

- B. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.
- D. Align markers so that numbering/lettering is visible from the access opening of the panel or device.
- E. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- F. Circuits with More Than 600 V: Identify raceway with "DANGER--HIGH VOLTAGE" in black letters 2 inches (51 mm) high, stenciled with paint at 10-foot (3-m) intervals over a continuous, painted orange background. Identify the following:
 - 1. Entire floor area directly above conduits running beneath and within 12 inches (305 mm) of a basement or ground floor that is in contact with earth or is framed above unexcavated space.
 - 2. Wall surfaces directly external to conduits concealed within wall.
 - 3. All accessible surfaces of concrete envelope around conduits in vertical shafts, exposed in the building, or concealed above suspended ceilings.
 - 4. Entire surface of exposed conduits.
 - 5. Each circuit's conductors shall be labeled with an engraved plastic nameplate identified by feeder breaker, starter or other source and shall be bundled together with plastic ties at each manhole, handhole or termination point.
- G. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:
 - 1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches (51 mm) wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
 - 2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
 - 3. Apply the following colors to the systems listed below:
 - a. Fire Alarm System: Red.
 - b. Fire-Suppression Supervisory and Control System: Red and yellow.
 - c. Combined Fire Alarm and Security System: Red and blue.
 - d. Security System: Blue and yellow.
 - e. Mechanical and Electrical Supervisory System: Green and blue.
 - f. Telecommunication System: Green and yellow.
- H. Circuit Identification Labels on receptacles: Install Pressure-sensitive, engraved plastic label on cover that indicates circuit number and power panel.
- I. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground line warning tape located directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches (400 mm) overall, use a single warning tape.
- J. Color-Coding of Secondary Phase Conductors: Color code shall comply with the requirements indicated in Division 26 SECTION 26 0519 "Low Voltage Electrical Power Conductors and Cables."
 - 1. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:

- a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 3/4" inch minimum wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
 - b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches (76 mm) from the terminal and spaced 3 inches (76 mm) apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

- K. Power Feeder Circuit Identification: Plastic laminate tags for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.
 - 1. Legend: 1/4-inch- (6.4-mm-) letter and number engraving with legend corresponding to indicated circuit designations.
 - 2. Tag Fasteners: Nylon cable ties.

- L. Apply identification to equipment as follows:
 - 1. Indicate equipment name or designation, for example: PANEL LA
 - 2. Indicate voltage, phase and wire characteristics, for example: 120/208 VOLTS, 3 PH, 4W.
 - 3. Indicate the circuit source, for example: FED FROM: TRANSFORMER TA

- M. Apply identification to junction boxes as follows:
 - 1. Identify all junction boxes 4" x 4" and larger
 - 2. For power circuits identify power source and circuit number if applicable, for example LA-12.
 - 3. For other systems identify the system, for example: TEL, DATA, or FA
 - 4. Use laminated plastic nameplates or permanent marker on the cover or door of the junction box.

- N. Method of nameplate attachment:
 - 1. Attach stamped stainless steel nameplates to the device with stainless steel wire or chain or secure under a case screw(s) not removed during normal maintenance or servicing.
 - 2. Attach all other laminated plastic nameplates with screws, rivets or adhesive. Double-sided tape is not acceptable. When adhesive is used, clean and degrease surfaces.
 - 3. Attach nameplates so that the enclosure rating for dust or moisture is not impaired.

- O. Apply identification to conductors as follows:
 - 1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
 - 2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
 - 3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.

- P. Apply warning, caution, and instruction signs as follows:
 - 1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
 - 2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8-inch- (9-mm-) high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

- Q. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm

systems, unless units are specified with their own self-explanatory identification. Apply labels for each unit of the following categories of equipment as follows or as indicated.

1. Access doors and panels for concealed electrical items.
2. Automatic transfer switches.
3. Battery racks.
4. Call system master station.
5. Clock/program master equipment.
6. Contactors.
7. Control panels.
8. Control stations.
9. Dimmers.
10. Disconnect and safety switches.
11. Electrical switchgear and switchboards.
12. Emergency system boxes and enclosures.
13. Enclosed circuit breakers.
14. Fire alarm master station or control panel.
15. Frequency converters.
16. Inverters.
17. Lighting contactors.
18. Motor-control centers.
19. Motor starters.
20. Panelboards, electrical cabinets, and enclosures.
21. Power-generating units.
22. Push-button stations.
23. Rectifiers.
24. Remote-controlled switches.
25. Security –monitoring master station or control panel.
26. Telephone switching equipment.
27. Terminal blocks.
28. Time switches.
29. Transformers.
30. TV/audio-monitoring master station.
31. Variable frequency drives.

R. Field mounted measurement and control device identification: Stainless steel nameplate, install on all devices as follows or where indicated:

1. Level switches.
2. Flow switches.
3. Limit switches.
4. Oxygen sensors.
5. Carbon monoxide sensors.
6. Pressure sensors.
7. Temperature sensors.

END OF SECTION

SECTION 26 0923

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the lighting control devices for systems 600 volts and below such as time or photoelectric switches, occupancy sensors or lighting contactors.

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. Descriptive information that states conformance to codes, recognized testing, or manufacturing standards.
 - 2. Manufacturer's name and catalog cuts listing type, model No., catalog No., materials, styles, finish and electrical ratings.
 - 3. Lighting control panel drawings, include the following for each panel provided:
 - a. U.L. certification.
 - b. Markings as required by the NEC Article 409.
 - c. Control schematic diagram.
 - d. Control panel door layout and inner panel layout drawings.
 - e. Bill of material.
 - f. For all equipment listed in the bill of material submit the manufacturer's name and catalog cuts listing type, model No., catalog No., materials, styles, finish and electrical ratings.
- B. Operations and Maintenance Manuals shall include the following information:
 - 1. All information submitted with shop drawings.
 - 2. Manufacturer's maintenance and repair instructions.
 - 3. Manufacturer's instructions provided with equipment.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Each type of lighting control device shall be from a single manufacturer, and shall be of the same style and model number.
- B. Lighting control panels shall be manufactured by a U.L. certified panelbuilder and conform to the requirements of U.L. 508A.

1.4 COORDINATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 OUTDOOR PHOTOELECTRIC SWITCHES

- A. Photocell: Provide self-contained, adjustable, weatherproof photo-electric control designed for mounting on an outdoor junction box. Control shall switch on at dusk and off at dawn. Photocell shall have 1800-watt (tungsten) contacts suitable for the voltage shown and shall include an inherent time delay in operation to prevent false switching. Furnish Tork 2101 (120V), Intermatic K4121 (120V).

2.2 LIGHTING CONTROL PANELS

- A. General: Lighting control panels shall comply with U.L. 508A.
 - 1. Enclosures: Each lighting contactor shall be provided with a NEMA 1 enclosure.
 - 2. Control Power: Each lighting contactor shall have a built-in control power transformer for 120-volt control. Transformers shall be fused and oversized as necessary to accommodate control devices.
 - 3. Accessories: Provide auxiliary contacts, cover mounted switches, pilot lights or other devices as shown on the Drawings or as required by the control system.
 - 4. All connections shall be on numbered terminal strips.
- B. Multipole Contactors: Electrically operated and electrically [mechanically] held, complying with NEMA ICS 2.
 - 1. Current Rating for Switching: As indicated on drawings.
 - 2. Number of poles: 3
 - 3. Manufacturer: Provide Square D Class 8903 Type S or equal.
 - 4. Combination Unit: Each lighting contactor shall be a combination type unit with a thermal magnetic circuit breaker. Handle shall have provisions for locking in the on and off positions and the door shall have provisions for padlocking closed.

2.3 SWITCH-BOX OCCUPANCY SENSORS

- A. Description: PIR type with integral power-switching contacts rated for 800 W at 120-V ac, suitable for LED fixtures, fluorescent light fixtures with magnetic or electronic ballasts, or 1/6-hp motors; and rated for 1000 W at 277-V ac, suitable for LED fixtures, fluorescent light fixtures with magnetic or electronic ballasts, or 1/3-hp motors, minimum.
 - 1. Include ground wire.
 - 2. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (215 to 2150 lx); keeps lighting off when selected lighting level is present.

2.4 INDOOR OCCUPANCY SENSORS

- A. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.
 - 1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - 2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 - 3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
 - 4. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 - 5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
 - 6. Bypass Switch: Override the on function in case of sensor failure.
 - 7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (215 to 2150 lx); keeps lighting off when selected lighting level is present.

- B. PIR Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.
 - 1. Detector Sensitivity: Detect occurrences of 6-inch (150-mm) minimum movement of any portion of a human body that presents a target of at least 36 sq. in. (232 sq. cm).
 - 2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
 - 3. Detection Coverage (Corridor): Detect occupancy within 90 feet (27 m) when mounted on a 10-foot- (3-m-) high ceiling.
- C. Ultrasonic Type: Ceiling mounting; detect occupancy by sensing a change in pattern of reflected ultrasonic energy in area of coverage.
 - 1. Detector Sensitivity: Detect a person of average size and weight moving at least 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
 - 2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. (56 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
 - 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on an 8-foot- (2.4-m-) high ceiling.
 - 4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. (186 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
 - 5. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet (27 m) when mounted on a 10-foot- (3-m-) high ceiling in a corridor not wider than 14 feet (4.3 m).
- D. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on and off functions shall be selectable in the field by operating controls on unit.
 - 1. Sensitivity Adjustment: Separate for each sensing technology.
 - 2. Detector Sensitivity: Detect occurrences of 6-inch (150-mm) minimum movement of any portion of a human body that presents a target of at least 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving at least 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
 - 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

2.5 OUTDOOR MOTION SENSORS (PIR)

- A. General Description: Suitable for operation in ambient temperatures ranging from minus 40 deg F (40 deg C) to 130 deg F (54 deg C), UL 773A rated as rain-tight.
 - 1. Operation: Turn lights on when sensing infrared energy changes between background and moving body in area of coverage; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 - 2. Sensor Output: Suitable for switching 300 W of tungsten load at 120- or 277-V ac. Lamp holders shall comply with UL 1598 for wet locations.
 - 3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 - 4. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
 - 5. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outdoor junction box.
 - b. Relay: Internally mounted in a standard weatherproof electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 - 6. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.

7. Bypass Switch: Override the on function in case of sensor failure.
8. Automatic Light-Level Sensor: Adjustable from 1 to 20 fc (11 to 215 lx); keeps lighting off during daylight hours.

B. Detector Sensitivity: Detect occurrences of 6-inch (150-mm) minimum movement of any portion of a human body that presents a target of at least 36 sq. in. (232 sq. cm)

C. Detection Coverage: Up to 35 feet (11 m), with a field of view of 90 degrees.

PART 3 - EXECUTION

3.1 WIRING INSTALLATION

- A. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- B. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.2 FIELD QUALITY CONTROL

- A. Perform the following operational tests and inspections:
 1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for proper operation.
 2. Operational Test: Verify actuation of each sensor and adjust time delays.
- B. Remove and replace lighting control devices where operational tests indicate that they do not comply with specified requirements.

3.3 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose.

3.4 SENSOR INSTALLATION

- A. Install and aim sensors in locations to achieve at least 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

END OF SECTION

SECTION 26 2416

PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes panelboards for systems 600 volts and below.

1.2 SUBMITTALS

- A. Shop Drawings: Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes. For each panelboard and related equipment provide the following:
 - 1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Enclosure types and construction details.
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - e. Breaker layout and schedule.
- B. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 include the following:
 - 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 - 2. Time-current curves, including selectable ranges for each type of overcurrent protective device.
 - 3. Manufacturer's written instructions provided with equipment.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from a single manufacturer.
- B. Comply with Federal Specification W-P-115b Type 1, Class 1 and NEMA PB 1.

1.4 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:
 - a. Square D.
 - b. Eaton Corporation; Cutler-Hammer Products.
 - c. General Electric Co.; Electrical Distribution & Protection Div.

2.2 PANELBOARDS

- A. Enclosures: Flush- or surface-mounted cabinets as indicated on drawings. Enclosure ratings shall be per NEMA 250.
 - 1. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
 - 2. Door: Provide all panels with hinged door and keyed lock.
 - 3. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
 - 4. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.
 - 5. Hinged Front Cover: Where indicated provide entire front trim hinged to box and with standard door within hinged trim cover.
- B. Phase and Ground Buses:
 - 1. Material: Hard-drawn copper, 98 percent conductivity or tin-plated aluminum.
 - 2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
 - 3. Isolated Equipment Ground Bus: Where indicated provide and isolated ground bus adequate for branch-circuit equipment ground conductors; insulated from box.
 - 4. Extra-Capacity Neutral Bus: Where indicated provide a neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.
- C. Service Equipment Label: UL labeled for use as service equipment for panelboards used as the main service equipment.
- D. Future Devices: Provide mounting brackets, bus connections, circuit breaker fingers or stabs and all necessary appurtenances required for future installation of circuit breakers in all positions indicated as a space.

2.3 PANELBOARD SHORT-CIRCUIT RATING

- A. Fully rated to interrupt symmetrical short-circuit current available at terminals. Series rating is not acceptable.

2.4 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker:
 - 1. Circuit breakers shall meet the requirements of UL 489.
 - 2. Interrupting Capacity: Provide circuit breakers with interrupting capacities equal to or greater than the available fault currents shown on the Drawings. Minimum allowable interrupting capacity of 120- and 240-volt circuit breakers is 10,000 RMS symmetrical amperes. Minimum allowable interrupting capacity of 277- and 480-volt circuit breakers is 14,000 RMS symmetrical amperes.
 - 3. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 4. Electronic trip-unit circuit breakers shall have RMS sensing; field-replaceable rating plug; and with the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short-time pickup levels.
 - c. Long- and short-time time adjustments.
 - d. Where indicated provide Ground-fault pickup level, time delay, and I^2t response.
 - e. Provide with a sealable cover over the adjusting means, except for adjustable magnetic trips on thermal magnetic breakers which do not require covers.

5. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers for Personnel Protection: Provide UL Class A ground fault protection in addition to thermal magnetic protection. Circuit breaker shall conform to UL 943.
 6. Ground Fault Circuit Breakers for Equipment Protection: Provide 30 mA ground fault protection in addition to thermal magnetic protection.
 7. Multipole units enclosed in a single housing or factory-assembled to operate as a single unit.
- B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
1. Lugs: Suitable for number, size, and conductor materials.
 2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads.
 3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
 4. Shunt Trip: As shown on drawings.
 5. Undervoltage Trip: As shown on drawings.
 6. Auxiliary Contacts: As shown on drawings.
 7. Key Interlock Kit: As shown on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Provide enclosures rated for environmental conditions at installed location.
1. Outdoors, damp or wet: NEMA 250, Type 3R/12.
 2. Indoors, dry: NEMA 250, Type 1.
 3. Indoors, damp or wet: NEMA 250, Type 3R/12.
- C. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- D. Set field-adjustable switches and circuit-breaker trip ranges.
- E. Install filler plates in unused spaces.
- F. Flush Mounted Panels: Provide spare conduits installed in size and quantity to accommodate future growth. Spare conduits shall be routed from the panelboard to an accessible location suitable for adding conduit extensions, such as above ceilings, in storage and equipment areas, etc. Number and size of conduits for each panelboard shall be as follows: at least one 1-inch conduit, and one 3/4-inch conduit for every three spare breakers or unused panelboard spaces.
- G. Deliver panelboard keys provided with panels to the Owner.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and panelboards as specified in Division 26 SECTION "Electrical Identification".
- B. Create a directory to indicate installed circuit loads. Use a computer to create directory; handwritten directories are not acceptable.

3.3 FIELD QUALITY CONTROL

- A. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
 - 1. Measure as directed during period of normal system loading.
 - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
 - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
 - 4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.4 CLEANING

- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes wiring devices for systems 600 volts and below, which includes receptacles, switches and similar equipment.

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. Descriptive information that states conformance to codes, recognized testing, or manufacturing standards.
 - 2. Manufacturer's name and catalog cuts listing type, model No., catalog No., materials, styles, finish and electrical ratings.
- B. Operations and Maintenance Manuals shall include the following information:
 - 1. All information submitted with shop drawings.
 - 2. Manufacturer's maintenance and repair instructions.
 - 3. Manufacturers written instructions provided with the equipment.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Each type of wiring device shall be from a single manufacturer, and shall be of the same style and model number.

PART 2 - PRODUCTS

2.1 FINISHES

- A. Color:
 - 1. Wiring Devices Connected to Normal Power System: White, unless otherwise indicated on drawings or required by NFPA 70.

2.2 RECEPTACLES

- A. 20 Ampere, 125-volt Straight-Blade-Type Receptacles:
 - 1. Comply with NEMA WD 1, NEMA WD 6, FEDERAL SPECIFICATION W-C-596G, and UL 498.
 - 2. 20 Ampere Grounding type duplex receptacles shall be Specification Grade, NEMA 5-20R, Cooper No. 5352, Leviton No. 5352, Hubbell No. HBL 5352 Series or equal.
 - 3. 20 Ampere Grounding type single receptacles shall be Specification Grade, NEMA 5-20R, Cooper No. 5351, Leviton No. 5361, Hubbell No. 5361, or equal.
- B. Ground Fault Circuit Interrupting (GFCI) 20 Ampere, 125-volt Straight-Blade-Type Receptacles:
 - 1. Comply with NEMA WD 1, NEMA WD 6, FEDERAL SPECIFICATION W-C-596G, UL 498 and UL 943.
 - 2. GFCI 20 Ampere Grounding type duplex receptacles shall be Specification Grade, NEMA 5-20R, Cooper No. XGF20, Leviton No. 6898, Hubbell No. GF5362 Series or equal.
 - 3. Unless otherwise indicated, feed-through feature shall not be used to protect downstream receptacles.

- C. Isolated Ground (IG) 20 Ampere, 125-volt Straight-Blade-Type Receptacles:
 - 1. Comply with NEMA WD 1, NEMA WD 6, FEDERAL SPECIFICATION W-C-596G, and UL 498.
 - 2. 20 Ampere Isolated Ground type duplex receptacles shall be Specification Grade, NEMA 5-20R, Cooper No. IG5362, Leviton No. 5362IG, Hubbell No. HBL IG5362 Series or equal.

- D. Transient Voltage Surge Suppression (TVSS) 20 Ampere, 125-volt Straight-Blade-Type Receptacles:
 - 1. Comply with NEMA WD 1, NEMA WD 6, FEDERAL SPECIFICATION W-C-596G, and UL 498.
 - 2. Surge Protection U.L. Listed to Standards 1449 and 498.
 - 3. TVSS Components: Multiple metal-oxide varistors; with a suppressed voltage rating of not more than 400 volts and a transient suppression rating of at least 240 Joules.
 - 4. Active TVSS Indication: Visual indicator on face of device to indicate device is "active" or "no longer in service."
 - 5. Identification: Distinctive marking on face of device to denote TVSS-type unit.
 - 6. 20 Ampere TVSS Grounding type duplex receptacles shall be Specification Grade, NEMA 5-20R, Cooper No. 5350 or 5362, Leviton No. 5380 or 7380, Hubbell No. HBL 5360 or 5362 Series or equal.

- E. Faceplates or Covers for 20 Ampere Receptacles:
 - 1. Faceplates for surface-mounted boxes in exposed conduit work shall be galvanized steel.
 - 2. Faceplates for flush-mounted duplex receptacles shall be stainless steel, Cooper 93000 series, Leviton No. 84000 series, Hubbell No. S8 Series, or equal.
 - 3. Faceplates for flush-mounted single receptacles shall be stainless steel, Cooper 93000 series, Leviton No. 84000 series, Hubbell No. S7 Series, or equal.
 - 4. Faceplates for flush-mounted GFCI and TVSS receptacles shall be stainless steel, Cooper 93000 series, Leviton No. 84000 series, Hubbell No. S26 Series, or equal.
 - 5. Faceplates for weatherproof single receptacles shall be metal, heavy duty, self-closing, Cooper 1990 or 992, Leviton No. 4925-2, Hubbell No. 7420 or equal.
 - 6. Faceplates for weatherproof duplex receptacles shall be metal, heavy duty, Red Dot No. CK5GV, Cooper No. 994 or 989, Leviton 4926 or 4970, Hubbell HBL 5205W0 or HBL 5206W0, or equal.
 - 7. Faceplates for weatherproof ground fault interrupting duplex receptacles shall be metal, heavy duty, self-closing, Cooper No. 966 or 1966, Leviton 6196-FS or 6196-VFS, Hubbell No. WP26, or WPFS26 or equal.
 - 8. Weatherproof While In Use Covers: Where indicated and at all wet location receptacles, provide weatherproof while in use covers in accordance with NEC 406.9. Covers shall be die cast aluminum, heavy duty, self-closing, rated NEMA 3R, and be lockable. Provide Thomas & Betts/Red Dot "Code Keeper" (metal) series, Intermatic "Guardian" WP1000MC (metal) series, or equal.

- F. 30 Ampere and Larger Straight Blade Receptacles:
 - 1. 30-ampere, 125-volt, grounded, 2-pole, 3-wire, NEMA 5-30R: Cooper No. 1233, Leviton No. 5371, Hubbell No. HBL9308, or equal. Provide with stainless steel faceplate.
 - 2. 30-ampere, 125/250-volt, ungrounded, 3-pole, 3-wire, NEMA 10-30R: Cooper No. 38B, Leviton No. 5207, Hubbell No. HBL9350, or equal. Provide with stainless steel faceplate.
 - 3. 30-ampere, 125/250-volt, grounded, 3-pole, 4-wire, NEMA 14-30R: Cooper No. 1257, Leviton No. 278, Hubbell No. HBL9430A, or equal. Provide with stainless steel faceplate.
 - 4. 50-ampere, 250-volt, grounded, 2-pole, 3-wire, NEMA 6-50R: Cooper No. 1254, Leviton No. 5374, Hubbell No. HBL9367, or equal. Provide with stainless steel faceplate.
 - 5. 50-ampere, 125/250-volt, ungrounded, 3-pole, 3-wire, NEMA 10-50R: Cooper No. 32B, Leviton 5206, Hubbell No. HBL7962, or equal. Provide with stainless steel faceplate.
 - 6. 50-ampere, 125/250-volt, grounded, 3-pole, 4-wire, NEMA 14-50R: Cooper No. 1258, Leviton No. 279, Hubbell No. HBL9450A, or equal. Provide with stainless steel faceplate.

- G. Specialty Receptacles:

1. Industrial Heavy-Duty Pin and Sleeve Devices: Comply with IEC 309-1 and IEC 309-2.
2. Hazardous (Classified) Location Receptacles: Comply with NEMA FB 11.

2.3 SWITCHES

- A. 20 Ampere, 120- to 277-volt, Toggle Type Snap Switch:
 1. Comply with NEMA WD 1, FEDERAL SPECIFICATION W-C-896F and UL 20.
 2. Single pole switches shall be Specification Grade, Cooper No. 2221, Leviton No. 1221, Hubbell No. HBL1221 Series or equal.
 3. Double pole switches shall be Specification Grade, Cooper No. 2222, Leviton No. 1222, Hubbell No. HBL1222 Series or equal.
 4. Three-way switches shall be Specification Grade, Cooper No. 2223, Leviton No. 1223, Hubbell No. HBL1223 Series or equal.
 5. Four-way switches shall be Specification Grade, Cooper No. 2224, Leviton No. 1224, Hubbell No. HBL1224 Series or equal.
 6. Key switches (utilizing a flat metal blade type key) shall be Specification Grade, Cooper No. 2221L, Leviton No. 1221L, Hubbell No. HBL1221L Series or equal.
 7. Pilot light switches (toggle illuminated when switch is "On") shall be Specification Grade, Cooper No. 2221PL, Leviton No. 1221PL, Hubbell No. HBL1221PL Series or equal.
- B. Faceplates or covers for Toggle Type Snap Switches:
 1. Faceplates for surface-mounted switches in exposed conduit work shall be galvanized steel.
 2. Faceplates for flush-mounted switches shall be stainless steel, Cooper No. 93070 series, Leviton No. 84000, Hubbell No. S Series, or equal.
 3. Faceplates for weatherproof switches shall be enclosed with external lever, Red Dot No. CCT series, Leviton 1432 or equal
- C. Dimmer Switches, Incandescent Lighting Control:
 1. Comply with NEMA WD 1, UL 20, and UL 1472
 2. Solid-state units with integral audible frequency and EMI/RFI filters.
 3. Integral mechanical air-gap switch to totally disconnect power from the load when in the "off" position.
 4. Continuously variable, full range control of light intensity. Following power outage, the lighting will come back on at the same intensity.
 5. Rating: 120-volts, 60 Hz, 2000 watts for use on a 20 ampere circuit.
 6. Slider Type Control, Single Pole, 120-volts: Lutron N-2000, or equal.
 7. Rotary Knob Type Control, Single Pole, 120-volts: Lutron C-2000, Leviton 62000, or equal.
 8. Provide unit complete with non-metallic, white faceplate.

2.4 MULTIOUTLET ASSEMBLIES

- A. General: Provide a multi-outlet assembly consisting of a surface metal raceway with a factory assembled receptacle harness. Assembly shall be complete with fittings, boxes, adapters, and all accessories necessary for a complete and finished installation. Install in accordance with NEC Article 380.
- B. Material: Provide raceway constructed of steel. Finish shall be manufacturer's standard paint finish, Receptacles shall not be painted.
- C. Supports: Join sections with couplings and securely fasten to wall at intervals not exceeding 30 inches. Fasteners shall be flat head type to avoid abrading wire insulation.

- D. Receptacles: Provide single, NEMA 5-20R receptacles mounted at 12-inch intervals. Provide a single circuit, 3-wire #12 AWG wiring harness. Provide a ground clamp installed in each section of raceway and connected to the grounding conductor.

2.5 TELEPHONE/POWER SERVICE POLES

- A. Description: Factory-assembled and wired units to extend power, voice and data communication from distribution wiring concealed in ceiling to devices or outlets in pole near floor.
 - 1. Poles: Nominal 2.5-inch- (65-mm-) square cross section, with height adequate to extend from floor to at least 6 inches (150 mm) above ceiling, and with separate channels for power wiring and voice and data communication cabling.
 - 2. Mounting: Ceiling trim flange with concealed bracing arranged for positive connection to ceiling supports; with pole foot and carpet pad attachment.
 - 3. Finishes: Manufacturer's standard painted finish and trim combination.
 - 4. Wiring: Sized for minimum of five No. 12 AWG power and ground conductors; and a minimum of four, 4-pair, Category 3 or 5 voice and data communication cables.
 - 5. Power Receptacles: Two duplex, 20-A, heavy-duty, NEMA WD 6, Configuration 5-20R units.
 - 6. Voice and Data Communication Outlets: Four RJ-45 Category 6 jacks.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install devices and assemblies level, plumb, and square with building lines.
- B. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- C. Remove wall plates and protect devices and assemblies during painting.
- D. GFCI receptacle wiring. Each location shown as a GFCI receptacle shall have a GFCI receptacle at that location. Each GFCI receptacle shall be wired to the line side terminals. Unless specifically noted, no wiring shall be connected to the load terminals of the GFCI receptacle.
- E. Outlet box: Provide a dedicated outlet box for the dimmer switch. Do not gang dimmer switches in multi-gang outlet boxes.
- F. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' written instructions.

3.2 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. After installing wiring devices and after electrical circuitry has been energized, test for proper polarity, ground continuity, and compliance with requirements.
 - 2. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.
- B. Remove malfunctioning units, replace with new units, and retest as specified above.

END OF SECTION

SECTION 26 2816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes enclosed safety switches and enclosed circuit breakers.

1.2 REFERENCES

- A. Applicable parts of the following industry codes and standards and references shall be considered an integral part of this section. Unless otherwise noted, the latest edition of codes and standards in effect at the time of purchase shall be followed.
 - 1. Federal Specification (FS)
 - a. FS W-C-375 – Circuit Breakers, Molded Case; Branch Circuit and Service
 - 2. National Electrical Manufacturers Association (NEMA)
 - a. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum)
 - b. NEMA FU 1 – Low Voltage Cartridge Fuses
 - c. NEMA KS 1 – Heavy Duty Enclosed Dead-Front Switches (600 Volts Maximum)
 - 3. National Fire Protection Association (NFPA)
 - a. NFPA 70 – National Electrical Code (NEC)
 - 4. Underwriters Laboratories (UL)
 - a. UL 50 – Enclosures for Electrical Equipment, Non-Environmental Considerations
 - b. UL 50E – Enclosures for Electrical Equipment, Environmental Considerations
 - c. UL 98 – Enclosed and Dead-Front Switches
 - d. UL 489 – Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for circuit breakers, switches, enclosures, and other installed components and accessories.
- B. Shop Drawings: For each type of enclosed switch, fuse, enclosed circuit breaker, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
 - 1. Enclosure types, ratings, and outline drawings.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current rating.
 - 4. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 5. Fuse ratings, type, and time-current coordination curves for each fuse.
- C. Operation and Maintenance Data: For safety switches and enclosed circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1, include the following:
 - 1. Manufacturer's written instructions for testing and adjusting safety switches and circuit breakers.
 - 2. Time-current curves, including selectable ranges for each type of circuit breaker.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Switches and all components shall be designed, manufactured, and tested in accordance with the NEMA KS 1 and UL 98.
- C. Fuses shall be UL listed and conform to NEMA FU 1.

1.5 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Quantity equal to 20 percent of each fuse type and size, but no fewer than 3 of each type and size.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

PART 2 - PRODUCTS

2.1 ENCLOSED SAFETY SWITCHES

- A. Fusible and Non-Fusible Safety Switches, 1200 amp and smaller: Provide safety switches, Heavy Duty Type HD conforming to NEMA KS 1 and UL 98 600-Volts, horsepower rated for motors as required. Provide number of poles and ampacity as noted or required by Code. Switches shall be fused where indicated, or where required by UL labeling or listing of equipment served. Handle shall have provisions for padlocking in the off position and the door shall have provisions for padlocking closed.
- B. All safety switches in publicly accessible spaces shall have provisions for padlocking in the on position or if indicated on the plans.
- C. Switch blades shall be visible when the switch is in the “Off” position and the door is open.
- D. Provide factory installed neutral assembly for switches installed on circuits with a neutral.
- E. Provide factory installed ground lug kits.
- F. Safety Switches shall have defeatable door interlocks that prevent the door from opening when the handle is in the ON position. Defeater mechanism shall be accessible.
- G. Fusible switches 30-amp through 600-amperes shall be furnished with rejection type Class “R” fuse clips and 601-amp through 1200-amperes shall be furnished with Class “L” fuse clips unless otherwise indicated.

2.2 FUSES FOR SWITCHES

- A. Interrupting Capacity: Provide fuses with interrupting capacities equal to or greater than the available fault currents shown on the Drawings.
- B. Type and Speed: Provide fuses of various types and of the appropriate speeds to provide selective coordination. Submit time-current coordination curves for each fuse.
- C. Labeling: Provide a nameplate or a manufacturer's preprinted label attached adjacent to each fuse or set of fuses. Label shall indicate manufacturer's name, manufacturer's catalog number, UL class, voltage rating, current rating, and speed.
- D. Manufacturer: All fuses provided shall be of the same manufacturer.

2.3 DOUBLE THROW SAFETY SWITCHES

- A. Double Throw Fusible and Non-Fusible Safety Switches: Provide double throw safety switches conforming to NEMA KS 1 and UL 98, 600-Volts, horsepower rated for motors as required. Provide number of poles and ampacity as noted or required by Code. Switches shall be fused where indicated, or where required by UL labeling or listing of equipment served.
- B. Safety switch operator shall be padlockable in each of the three positions and the door shall be padlockable closed.
- C. Switch blades shall be visible when the switch is in the "Off" position and the door is open.
- D. Provide factory installed neutral assembly for switches installed on circuits with a neutral.
- E. Provide factory installed ground lug kits.
- F. Fusible switches shall be furnished with rejection type Class "R" fuse clips.
- G. The following factory modifications are to be included:

2.4 ENCLOSED CIRCUIT BREAKERS

- A. Enclosed Circuit Breakers: Provide enclosures for thermal magnetic circuit breakers conforming to NEMA 250 and UL 489. Handle shall have provisions for padlocking in the off position and the door shall have provisions for padlocking closed.
- B. Except for NEMA 1 units, all other enclosed circuit breakers shall have an exterior operating handle. Units with only covers or doors over breaker handles are not acceptable.
- C. All enclosed circuit breakers in publicly accessible spaces shall have provisions for padlocking in the on position or if indicated on the plans.
- D. Provide factory installed neutral assembly for enclosed circuit breakers installed on circuits with a neutral.
- E. Provide factory installed ground lug kits.
- F. Circuit breakers: Provide circuit breakers with the current and voltage ratings as shown. Circuit breakers shall be UL listed and conform to UL 489, and Federal Specification W-C-375B/GEN.

- G. Interrupting Capacity: Provide circuit breakers with interrupting capacities equal to or greater than the available fault currents shown on the Drawings. Minimum allowable interrupting capacity of 120- and 240-volt circuit breakers is 10,000 RMS symmetrical amperes. Minimum allowable interrupting capacity of 277- and 480-volt circuit breakers is 14,000 RMS symmetrical amperes.
- H. Series Rating: Do not apply circuit breakers at series interrupting ratings. Each breaker shall be capable of interrupting the fault current available at that location in the distribution system without the assistance of any other device(s).
- I. Adjustable Circuit Breakers: Provide with a sealable cover over the adjusting means, except for adjustable magnetic trips on thermal magnetic breakers which do not require covers.
- J. Molded Case thermal Magnetic Circuit Breakers: Provide circuit breakers with overcenter toggle type mechanisms for quick make and break, trip free operation. Breakers shall provide thermal overload and instantaneous magnetic trip for each pole of the unit. Breakers larger than 100 amperes shall have adjustable magnetic trip. Multiple pole breakers shall have one common operating handle.
- K. Ground Fault Trip for Thermal Magnetic Circuit Breakers: Where shown on the Drawings, provide a ground fault sensing unit and a shunt trip circuit breaker. Ground fault sensing unit shall be a solid state device and shall conform to UL 1053. Sensing unit shall have adjustable pickup current and time delay. The unit shall have a test button and an indicator to show when the unit has tripped. Provide any current transformers required by the unit.
- L. Solid State Trip Circuit Breakers: Provide 80 percent rated circuit breakers. Provide circuit breakers with an overcenter toggle type mechanism or a two-step, stored energy mechanism. Stored energy mechanisms shall be manually operated. The mechanism shall provide quick make and break, trip free operation. Multiple pole breakers shall have one common operating handle. The integral trip unit shall be independent of any external power source. Provide indicators to show when the breaker has tripped and the protective feature which initiated the trip. Sensing units shall sense RMS components.
- M. Accessories: Provide auxiliary contacts, shunt tripping mechanisms, handle locking devices, lugs or terminals, and any other accessory as specified, indicated on the Drawings, or where required to perform the functions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.
- B. Verify that the ratings of the enclosed breakers are consistent with the indicated requirements.

3.2 INSTALLATION

- A. Provide enclosures rated for environmental conditions at installed location Enclosures shall be listed and labeled as complying with UL 50 and UL 50E.
 - 1. Outdoors, damp or wet: NEMA 250, Type 3R/12.
 - 2. Indoors, dry: NEMA 250, Type 1.
 - 3. Indoors, damp or wet: NEMA 250, Type 3R/12.
- B. Mount plumb and rigid without distortion of enclosure.

- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 SECTION 26 0553 "Identification for Electrical Systems".
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 26 SECTION 26 0553 "Identification for Electrical Systems".

3.4 FUSE APPLICATIONS

- A. Service Entrance: Class RK1 time delay.
- B. Feeders: Class RK1, fast acting.
- C. Motor Branch Circuits: Class RK5 time delay.
- D. Spare Fuses: For each fuse of a particular amperage, voltage, type, and speed installed, provide 20 percent spare fuses, three minimum.

3.5 ADJUSTING

- A. Set field-adjustable circuit-breaker trip ranges.
- B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.6 CLEANING

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes to match original factory finish.

END OF SECTION

SECTION 28 3100

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish and install all wiring, conduit, standard and special wall boxes and cabinets to make a complete and functioning system as hereinafter specified and shown on the plans. It shall be the responsibility of the Contractor to provide all installation equipment and material compatible to the system supplied. All equipment shall be located as shown on the drawings. Any equipment not specifically mentioned in this specification or not shown on the drawings, but required for the operation of a completely functional system shall be furnished and installed.
- B. The system shall consist of addressable initiating and non-addressable notification devices as shown on the plans and required for a complete and operable system.

1.2 QUALITY ASSURANCE

- A. Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label. All control equipment is to be listed under UL 864, "Control Units for Fire-Protective Signaling Systems" as a single control system. Partial listing shall NOT be acceptable.
- B. All equipment shall be U.L. approved and installed in accordance with the requirements of the NFPA 70 - National Electric Code, local codes and these specifications, with the stricter requirement governing in case of possible variance.
- C. The Fire Alarm System shall meet all applicable state and local codes and standards and conform to all requirements of the Americans with Disabilities Act (ADA).
- D. System shall fully comply with NFPA 72 - National Fire Alarm Code and NFPA 101 – Life Safety Code.
- E. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

1.3 SUBMITTALS

- A. Prior to submitting to the Engineer, the system supplier shall submit drawings to the Authority Having Jurisdiction (AHJ) for approval. Approval in writing by the AHJ must accompany the submittals to the Engineer.
- B. Submit the following in accordance with NFPA 72 Section 4.5.1 for approval:
 - 1. Product data for all fire alarm control panels and annunciator panels, alarm initiating devices, notification appliances, auxiliary devices, wires and cables and other necessary accessories.
 - 2. Complete sequence of operations of all functions of the system.
 - 3. A list of every system address provided for purposes of alarm initiation status monitoring, supervised signaling, and auxiliary controls.
 - 4. Battery calculations to verify that the fire alarm system can provide a minimum of 5 minutes of alarm operation at the end of a 24-hour period of battery operation in a normal supervisory mode.
 - 5. Copies of licenses and certificates as required by the city, county and state.
 - 6. Control panel and annunciator panel inner wiring diagrams. Indicate equipment enclosure NEMA type, nameplate data, enclosure finish, and interior equipment layout dimensions.

7. Complete system-wiring diagram for all fire alarm system components. The system-wiring diagram shall include all interfaces to equipment supplied by others. The system-wiring diagram shall indicate wiring style, wiring and cable types and the wiring color code.
8. Floor plans indicating panel and device locations showing address of each addressable device. Show size and route of cable and conduits.

C. Operation and Maintenance Data, submit the following information:

1. Approved submittal information from 28 3100.1.3.B.
2. Completion documentation as required by NFPA 72 Section 4.5.2. Use the NFPA forms or equivalent.
3. Installation and maintenance sheets on all equipment.
4. Operations manual for the fire alarm control panel and fire alarm annunciator panel describing installation, operation, programming, control features, and system capabilities.
5. Documentation of panel programming and settings.
6. Copies of all letters of compliance, licenses, certifications and warranties.
7. Testing and inspection report for the fire alarm system.
8. As-built control panel and annunciator panel inner wiring diagrams. Indicate equipment enclosure NEMA type, nameplate data, enclosure finish, and interior equipment layout dimensions.
9. As-built system-wiring diagram for all fire alarm system components. The system-wiring diagram shall include all interfaces to equipment supplied by others. The system-wiring diagram shall indicate wiring style, wiring and cable types and the wiring color code.
10. As-built floor plans indicating panel and device locations showing address of each addressable device. Show size and route of cable and conduits.

1.4 COORDINATION

- A. Coordinate the layout and installation of fire alarm system components with other construction. Coordinate the installation of fire alarm system materials and equipment for an efficient flow of the Work.
- B. Coordinate the layout and installation of wall and ceiling mounted devices with other equipment including light fixtures, HVAC diffusers, windows and other assemblies and furniture.
- C. Coordinate duct detectors and fire/smoke dampers with installation of duct work for proper access for maintenance and service.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Smoke, Heat, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
 2. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
 3. Keys and Tools: One extra set for access to locked and tamperproofed components.
 4. Audible and Visual Notification Appliances: Quantity equal to 10 percent of each type installed, but not less than 1 unit of each type.
 5. Fuses: Two of each type installed in the system.

PART 2 - PRODUCTS

2.1 GENERAL

- A. System wiring shall be a 2 wire CLASS B.

- B. Electrically supervise all field wiring for open circuits and ground faults.

2.2 WIRE

- A. All fire alarm system wiring shall be new unless otherwise indicated.
- B. Conform with NFPA 72 and Article 760 of the National Electric Code.
- C. Provide wire and cable listed and/or approved by a recognized testing agency for use with a protective signaling system.
- D. Provide conductors recommended by the manufacturer and listed for use with the fire alarm system hardware. Provide the number and size of conductors as selected by the fire alarm system supplier, but not smaller than #18 AWG for initiating device circuits or signaling line circuits and not smaller than #14 AWG for notification appliance circuits. Provide twisted, unshielded cable for signaling line circuits.
- E. Wiring shall be color-coded throughout the system.
- F. Ground all equipment with an approved earth ground wire being supplied at the control units.
- G. Verify ALL wiring requirements with manufacturer prior to installation.

2.3 EXISTING FIRE ALARM SYSTEM

- A. The existing fire alarm system shall remain in operation at ALL times when the building is occupied for normal operation. System outage(s) shall be coordinated with the Owner at least 3 weeks prior to the outage. The system shall be returned to full operation prior to return of normal occupancy. If the system has not been returned to service when normal occupancy resumes, a full time fire watch shall be provided at no extra cost to the Owner until the fire alarm system is returned to operational condition. Fire watch plan and details shall be approved by the Fire Marshall.

2.4 PROVISIONS FOR FUTURE EXPANSION

- A. The fire alarm system shall be designed to accommodate for future expansion and modifications.
- B. Provide the following:
 - 1. Signaling Line Circuit(s): 25 percent spare device addresses minimum
 - 2. Notification Appliance Circuits: 20 percent spare circuit ampacity minimum
 - 3. Notification Appliance Circuits: Voltage drop not to exceed 80 percent of maximum allowed
 - 4. Battery and Battery Charger: 20 percent spare capacity minimum

2.5 FIRE ALARM CONTROL PANEL

- A. The microprocessor controlled fire alarm control panel (FACP) shall monitor active addressable devices within the building. All initiating devices shall be addressable and shall connect to the FACP.
- B. The FACP shall be 24 VDC operation with 120 VAC supply power. Twenty-four (24) hours of standby power with 5-minutes of alarm operation at the end of this period shall be provided by internally mounted, properly sized, sealed gel type lead acid batteries. The system batteries shall be supervised so that a low battery condition or disconnection of the battery shall be audibly and visually indicated at the control panel and remote annunciator.

- C. An alarm shall be displayed on a multi-line display. The point label and device type identifier shall be displayed. The system alarm indicator shall flash on the control panel and the remote annunciator until the alarm has been acknowledged at the control panel or the remote annunciator. Once acknowledged, the indicator shall latch on. A subsequent alarm received from another zone after acknowledged shall flash the system alarm indicator on the control panel and remote annunciator. The display shall show the new alarm information.
- D. The incoming power to the system shall be supervised so that any power failure must be audibly and visually indicated at the control panel and the remote annunciator. A power on indicator light shall be displayed continuously while incoming power is present.
- E. The System Expansion Modules shall be electrically supervised for module placement. Should a module become disconnected, the system trouble indicator must illuminate and audible trouble signal must sound.
- F. The control panel shall have a dedicated Supervisory Service indicator and a dedicated Supervisory Service Acknowledge Switch.

2.6 SYSTEM OPERATION

- A. Programming:
 - 1. Provide all hardware, software, programming tools, and documentation necessary to modify the fire alarm system on site.
 - 2. The fire alarm control panel shall allow for loading or editing special instructions and operating sequences as required. The system shall be capable of on site programming to accommodate and facilitate expansion, building parameter changes or changes as required by local codes.
 - 3. All software operations shall be stored in a non-volatile programmable memory within the fire alarm control panel. Loss of primary and secondary power shall not erase the instructions stored in memory.
- B. Provide alarm initiation from addressable manual stations located at each exit, addressable automatic smoke/heat detectors located as shown, addressable duct smoke detectors in the air handling units, addressable sprinkler water flow and sprinkler tamper switches. All devices shall be located as shown on the drawings.
- C. Provide a general alarm indication throughout the building when any alarm initiating device described is activated. Provide audio/visual alarm notification appliances on the inside and outside of the building. All devices shall be located as shown on the drawings.
- D. Provide the closure of all smoke doors, smoke dampers, and shutdown of all air handling equipment controlled during a general alarm. This function shall remain in effect until the system has been completely returned to its normal state (silencing of signals alone shall not reset this control status).
- E. The entire system may be reset only following the resetting of individual alarm initiation devices.
- F. The ability for selective input/output control functions based on ANDing, ORing, timing and special coded operations shall also be incorporated in the resident software programming of the system.
- G. To accommodate and facilitate job site changes, initiation devices shall be individually configurable on site to provide either alarm/trouble operation, alarm only, trouble only, current limited alarm, no alarm, normally closed device monitoring, a non-latching circuit or an alarm verification circuit.
- H. Notification appliance circuits shall be individually configurable on site to provide upon activation a fast march-time, slow march time, temporal code, or master code until silenced or reset.

- I. The system shall have the capability to store a minimum of 300 alarms and 300 troubles in a historical data file.
- J. The activation of any system smoke detector shall initiate an Alarm Verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described previously. If no second alarm occurs within one minute the system shall resume normal operation. The Alarm Verification shall operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation shall be selectable by zone.
- K. The control panel shall have the capability to display the number of times a device has gone into a verification mode.
- L. Alarm verification zones shall have the capability of being divided into seven different groups where by only two verification zones from a group will confirm the first activation and cause the panel to follow programmed alarm sequence.
- M. A manual evacuation switch shall be provided to operate the systems alarm notification appliances. Other control circuits shall not be activated. However, a true alarm shall be processed as described previously.
- N. A manual door holder release switch shall be provided to release all door holders. Other control circuits shall not be activated. However, a true alarm shall be processed as described previously.
- O. Activation of an auxiliary bypass switch shall override the automatic functions either selectively or throughout the system.
- P. Alarm and trouble conditions shall be immediately displayed on the control panel from alphanumeric LCD display. If more alarms or troubles are in the system the operator may scroll to display new alarms.
- Q. The system shall have an alarm list key that will allow the operator to display all alarms, troubles, and supervisory service conditions with the time of occurrence.
- R. The actuation of the enable walk test program at the control panel shall activate the "Walk Test" mode of the system which shall cause the following to occur:
 - 1. The city connection circuit shall be disconnected.
 - 2. Control relay functions shall be bypassed.
 - 3. The control panel shall show a trouble condition.
 - 4. The alarm activation of any initiation device shall cause the audible signals to code a number of pulses to match the zone number.
 - 5. The panel shall automatically reset itself after signaling is complete.
 - 6. Any momentary opening of an initiating or notification appliance circuit wiring shall cause the audible signals to sound for 4 seconds to indicate the trouble condition.
 - 7. The control panel shall have the capacity of 8 distinctive walk test groups.
- S. All auxiliary manual controls shall be supervised so that all switches must be returned to the normal automatic position to clear system trouble.
- T. Each independently supervised circuit shall include a discrete read-out to indicate disarrangement conditions per circuit.
- U. The system shall have provisions for disabling and enabling all circuits individually for maintenance and testing purposes.

2.7 FIRE SPRINKLER OPERATIONS

- A. The activation of any standpipe or sprinkler valve tamper switch shall activate the system supervisory service audible signal and illuminate the indicator at the control panel and the remote annunciator. Differentiation between valve tamper activation and opens and/or grounds on fire alarm initiation circuit wiring shall be provided.
- B. Activating the Supervisory Service Acknowledge Switch shall silence the supervisory audible signal while maintaining the Supervisory Service indicator to show the tamper contact is still in the off-normal station.
- C. Restoring the valve to the normal position shall cause the Supervisory Service indicator to extinguish.
- D. Restoring the valve to the normal position shall cause the supervisory service audible signal to pulse thus indicating restoration to normal position. Activating the Supervisory Service Acknowledge Switch will silence the audible signal and restore the system to normal.

2.8 ELEVATOR OPERATIONS

- A. General: The fire alarm system shall be interfaced with the elevator control system to provide information and control signals required for proper operation.
- B. Smoke Detection: Provide at each elevator lobby and elevator machine room for elevator recall control.
- C. Sprinkler Operation: Provide heat detection at elevator shaft and elevator machine room to activate prior to sprinkler activation for elevator control and shutdown.
- D. Coordination: Fire alarm system supplier shall coordinate all features and functions required for elevator operation with the elevator supplier.

2.9 POSTED INSTRUCTION

- A. System instructions shall be posted at each fire alarm panel and fire alarm annunciator panel. Instructions shall briefly describe the functional operation of the system under normal, alarm, and trouble conditions. Instructions shall interpret the meaning of displays and signals. Instructions shall describe the appropriate response to each condition. Provide instructions on printed or typewritten sheet(s) or card(s) laminated for protection against moisture and dirt.

2.10 FIRE ALARM ANNUNCIATOR

- A. Where shown on the plans, provide and install an alpha/numeric Fire Alarm Annunciator(s), with a multi-line display. Annunciator shall display all alpha/numeric messages as displayed at the FACP. Annunciator shall also contain an alarm, trouble and supervisory service indicator and acknowledgment switches, system reset and alarm silence switch, (3) programmable indicators, alarmed silence indicator and a key switch to activate or deactivate all other switches.

2.11 NAC POWER EXTENDER PANEL

- A. Expansion (NAC) panels shall be utilized to provide notification appliance power as required in locations remote from the fire alarm control panel.
- B. The NAC Power Extender panel shall be a stand-alone panel capable of powering a minimum of 4 notification appliance circuits. Notification appliance circuits shall be rated at 2 amps each. Panel shall provide capability to be expanded to 8 notification appliance circuits.

- C. The internal power supply & battery charger shall be capable charging batteries internally mounted or mounted in an external cabinet.
- D. Alarms from the host fire alarm control panel shall signal the NAC power extender panel to activate. The panel shall monitor itself and each of its NACs for trouble conditions and shall report trouble conditions to the host panel.
- E. The NAC Power Extender panel shall be supervised by the FACP.
- F. NAC Power Extender panels shall be located in equipment rooms or spaces as approved by the Engineer. Panel shall be mounted at nominally 60 inches above the floor to the top of the panel. NAC power extender panels are NOT permitted to be mounted above ceilings or in any location difficult to access.
- G. Power for the NAC Power Extender panel shall be from a dedicated circuit. Provide a handle lock for the circuit breaker serving the panel.
- H. Provide automatic smoke detection at the location of each NAC power extender panel in accordance with NFPA 72, Article 4.4.5. Detectors shall be provided at each location even if not shown on the Drawings.

2.12 DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT):

- A. Provide communicator for connection from the Main FACP to the Local Fire Department or an approved central station (as required by Local Codes). Communicator type shall be as required by the local AHJ and shall be U.L. Listed to U.L. 864 conforming to the requirements of NFPA 72. Communicator shall transmit all alarms and be capable of supervising two telephone lines, if one line fails for more than 45 seconds a built in trouble alert shall be activated and a trouble signal automatically transmitted to the central station on the remaining line. The Communicator shall also send a test signal to the central station every 24 hours at a programmed time of day or night. Communicator shall be monitored by a U.L. Listed Monitoring Company.
- B. Provide communicator complete and ready for operation upon connection of communications lines by the Owner.

2.13 INITIATING DEVICES

- A. All initiating devices shall be addressable.
- B. Manual fire alarm pull stations: Manual fire alarm pull stations shall be double action plainly marked to "Push" and then "Pull Lever" located as shown on the plans.
 - 1. Indoor Protective Shield: At all pull stations unless otherwise indicated, provide a factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
- C. Smoke Detectors and Bases: The smoke sensors shall be of the photoelectric type and shall communicate actual smoke chamber values to the system control unit. The sensors shall be listed to UL Standard 268 and shall be documented as compatible with the control equipment to which they are connected. The sensors shall be listed for both ceiling and wall mount applications. Each sensor and/or base shall contain an indicator that will flash each time it is scanned by the control unit (about once every 4 seconds).
- D. Heat Detectors and Bases: The heat sensors shall be self-restoring for both rate of rise and fixed temperature set points and rate of rise shall be selectable at 15 degrees or 20 degrees F per minute. Fixed

temperature set point shall be 135 degrees F for alarm. Heat Sensors shall be capable of being programmed as a utility device to monitor for temperature extremes in the range from 32 degrees F to 158 degrees F (0 degrees C to 70 degrees C). Heat Sensors shall utilize the same Bases as other sensors.

- E. Duct Smoke Detectors: The duct smoke detectors shall operate as described under smoke detectors above. Detectors shall be equipped with a functional test device circuit capable of simulating a maximum acceptable amount of smoke for alarm. The test device circuit shall provide individual local tests of all components of the smoke detector and shall not require generation of actual smoke within the A.H.U. Provide two (2) sampling tubes. Provide each duct sensor with a remote alarm indicator/test switch.
- F. Provide guards where indicated.
- G. Contractor shall provide all backboxes, standard and special as required for each location.

2.14 NOTIFICATION APPLIANCES

- A. Notification Appliances shall contain the following features:
 - 1. Audible/Visual Appliances for Group, Zoned or General Alarm notification.
 - 2. Supervision of each individual appliance wiring and connections.
 - 3. All strobes on the same SLC circuit shall be synchronized.
 - 4. All strobes within a space or visible from a space shall be synchronized.
 - 5. Horn sounding pattern shall be selectable from the following:
 - a. Temporal Coded
 - b. March Time Coded
 - 6. Horns controlled separately from strobes on same circuit allowing on until silenced and on until reset operation.
- B. Interior Audible/Visual Notification Appliance (fire alarm audible/visual signal device): Provide a red, horizontal wall mount appliance with UL 1971/ADA strobe unit and horn, 24VDC. Provide 75 candela xenon flasher unless other candela brightness is indicated on the drawings.
- C. Interior Visual Notification Appliance (fire alarm visual only signal device): Provide a red, horizontal wall mount appliance with UL 1971/ADA strobe unit, 24VDC. Provide 75 candela xenon flasher unless other candela brightness is indicated on the drawings.
- D. Wire Guards: Provide wire guards for all audible/visual signals located in gymnasiums or multi-purpose rooms or where indicated on the drawings.
- E. Exterior Notification Appliance: Provide a weatherproof vibrating type horn or horn and strobe type as shown, with a weatherproof box.
- F. Contractor shall provide all backboxes, standard and special as required for each location.

2.15 CONTROL RELAYS

- A. Provide control relays for air handling equipment shutdown, smoke damper control, fire shutter control, and similar functions. Relays shall be 24VDC operation, mounted in surface cabinet with indicator to show when relay is energized. These relays shall be controlled and powered from the FACP. Contacts shall be 2PDT rated at 10 amps resistive 28VDC/120VAC. Relays shall be located in equipment rooms or spaces as approved by the Engineer. Relays shall be mounted at nominally 60 to 96 inches above the floor to the top of the relay, except relays used to shut down air handling equipment may be mounted at the unit control panel. Relays are NOT permitted to be mounted above ceilings or in any location difficult to access. Power circuits switched by the relay shall be dedicated circuits with a handle lock for

the circuit breaker. Provide a nameplate at the relay indicating the equipment identification name or power circuit being controlled.

2.16 MAGNETIC DOOR HOLDERS

- A. Provide 24 VDC magnetic door holders controlled by the fire alarm system. Unless otherwise shown, provide wall mounted semi-recessed type. Coordinate installation with door hardware. The FACP shall be equipped with auxiliary relays to release holders as required.

2.17 ISOLATORS

- A. Provide isolator module(s) to isolate wire-to-wire short circuits on Signaling Line Circuits (initiation circuits) while allowing the remainder of the circuit to continue to function. Isolator module shall be powered by the circuit – no external power source required. The module shall automatically disconnect the shorted portion of the circuit and when the circuit is repaired the module shall automatically reconnect the circuit. The module shall not require replacement or resetting after normal operation. The module shall have indicator light(s) to show unit status.

PART 3 - EXECUTION

3.1 FIRE ALARM INSTALLATION AND WIRING

- A. This Contractor shall furnish and install all wiring, conduit, junction boxes, and outlet boxes required for the installation of a complete system. All wiring shall be installed in metallic raceway.
- B. Detectors at Control Equipment: Provide automatic smoke detection at the location of each fire alarm control unit, fire alarm annunciator, auxiliary control panel, NAC power extender panel, and remote panel in accordance with NFPA 72, Article 4.4.5. Detectors shall be provided at each location even if not shown on the Drawings.
- C. Isolators:
 - 1. Multi-building Campus: Provide an isolator module on each circuit serving a separate structure at the facility. Install the module in the structure where the fire alarm control panel is located prior to the circuit exiting to serve the adjacent building.
 - 2. Multi-story Construction: Provide an isolator module on each circuit serving more than one floor level or provide a separate Signaling Line Circuit for each floor. Install the module on the primary floor served by the circuit prior to going to each other floor level(s).
 - 3. Provide isolator(s) at any location shown on the drawings.
 - 4. Install isolator modules at accessible locations nominally 60 inches above the floor. Location of each isolator shall be listed at the Fire Alarm Control Panel.
- D. Device installation:
 - 1. Devices shall be installed in accordance with details and notes on the drawings and in compliance with NFPA 72.
 - 2. Smoke Detectors: Install ceiling-mounted detectors not less than 4 inches from a side wall to the near edge. Install detectors located on the wall at least 4 inches but not more than 12 inches below the ceiling. For exposed solid joist construction, mount detectors on the bottoms of the joists. On smooth ceilings, install detectors not over 30 feet apart in any direction. Install detectors no closer than 5 feet from air registers.
 - 3. Audible Notification Appliances: Install not less than 80 inches above the finished floor nor less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille or as indicated. Combine audible and visual notification appliances at the same location into a single unit.

4. Visual Notification Appliances: Install not less than 80 inches above the finished floor and at least 6 inches below the ceiling.
 5. Fire Alarm Control Panel (FACP): Mount with tops of cabinets not more than 6 feet above the finished floor.
 6. Annunciator: Arrange as indicated, with the top of the unit no more than 6 feet above the finished floor.
- E. Installation of equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate subcontractors.
- F. Contractor shall not remove protective covers from smoke or heat sensors until all construction work and cleanup has been performed. If this is not adhered to, all cleaning costs to clean dirty smoke detectors shall be paid for by the Contractor.
- G. Contractor wiring installation:
1. Wiring Method:
 - a. Install all wiring in metal raceway according to Division 26/28.
 - b. Type MC Cable or flexible metal conduit may be “fished” in inaccessible spaces.
 - c. Cable in exposed, existing finished locations shall be installed in surface metal raceway.
 - d. Cable in exposed, unfinished locations shall be installed in exposed conduit.
 - e. All splices shall be made in junction boxes.
 - f. All raceways shall be routed parallel or perpendicular with building walls and structure.
 - g. Wiring Within Equipment Enclosures: Install conductors parallel with or at right angles to the sides and back of the enclosure. Bundle, lace, and train the 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 wiring diagrams of the system. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
 - h. System Wiring: Wire and cable shall be a type listed for its intended use by an approval agency acceptable to the Authority Having Jurisdiction (AHJ) and shall be installed in accordance with the appropriate articles from the current approved edition of the National Electric Code (NEC), (NFPA 70). It is the Contractor’s responsibility to obtain from the Fire Alarm System Manufacturer written instruction regarding the appropriate wire/cable to be used for this installation. No deviation from the written instruction shall be made by the Contractor without the prior written approval of the Fire Alarm System Manufacturer.
 - i. Color Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm initiating device circuits wiring and a different color code for supervisory circuits. Color-code notification appliance circuits differently from alarm-initiating circuits. Paint fire alarm system junction boxes and covers red.
- H. 120-Volt Power Circuits: Power for the Fire Alarm Control Panel, Smoke Dampers, NAC Power Extender panel(s), and other system equipment shall each be connected to a separate dedicated circuit. Provide a handle lock for each circuit breaker serving fire alarm system equipment. Clearly identify the equipment on the panelboard directory. Provide a nameplate at each fire alarm system equipment identifying the panelboard and circuit number providing power to that device.
- I. Grounding: Ground equipment and conductor and cable shields as specified by the equipment manufacturer. For audio circuits, minimize to the greatest extent possible ground loops, common mode returns, noise pickup, cross talk, and other impairments.
- J. Field quality control: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components, and adjustment of the system.

- K. Programming: Provide services of a factory-authorized service representative to program the system and enter all required data into the equipment.
- L. Cleaning and adjusting:
 - 1. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.
 - 2. Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls and sensitivities to suit actual occupied conditions. Provide at least one visit to the site for this purpose.

3.2 TESTING

- A. The manufacturer or manufacturer's representative shall coordinate and provide testing of the system in the presence of the Fire Marshall, Fire Department, or applicable AHJ in accordance with their testing requirements.
- B. Tests:
 - 1. Provide services of a factory-authorized service representative to supervise the pre-testing and final testing of the system.
 - 2. Pre-testing: Upon completing installation of the system, align, adjust, and balance the system and perform complete pre-testing. Determine, through pre-testing, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pre-testing. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.
 - 3. Report of Pre-testing: After pre-testing is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.
 - 4. System Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.
 - 5. System Final Tests: Test the system according to the procedures outlined in NFPA 72. Minimum required tests are as follows:
 - a. Contractor shall verify the absence of unwanted voltages between circuit conductors and ground.
 - b. Contractor shall Megger test all conductors other than those intentionally and permanently grounded with electronic components disconnected (prior to connecting equipment). Test for resistance to ground. Report readings less than 1 megohm for evaluation.
 - c. Contractor shall test all conductors for short circuits utilizing an insulation-testing device.
 - d. 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 the record drawings.
 - e. Verify the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.
 - f. Test initiating, notification, and signaling circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of the initiating and notification devices. Observe proper signal transmission according to class of wiring used.
 - g. Test each initiating device and notification appliance for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
 - h. Close each sprinkler valve and verify proper supervisory alarm.
 - i. Activate each sprinkler flow alarm and verify proper system alarm.
 - j. Measure and record the actual current draw of each Notification Appliance Circuit.
 - k. Test the system for all specified functions according to the manufacturer's operating 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 annunciator indications.

- l. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the period and in the manner specified.
- m. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- n. 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 upon the satisfactory completion of tests.
- o. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.
- p. In order to obtain a certificate of occupancy, demonstrate that the system meets the Specifications and complies with applicable standards. This final test shall be witnessed by a representative of the Authority Having Jurisdiction and a factory-authorized service representative.
- q. Fill out completion document as required by NFPA 72 section 4.5.2. Use NFPA forms or equivalent.

C. Demonstrate system operation in the presence of the Architect, Engineer, and Owner.

3.3 TRAINING

- A. Provide the services of a factory-authorized service representative at the project location to demonstrate the system and train Owner's maintenance personnel. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 8 hours training. Schedule training with the Owner at least seven days in advance.

3.4 SERVICE

- A. After the guarantee period, the manufacturer shall provide an annual preventative maintenance service contract upon request. The preventative maintenance service contract shall provide the service necessary for the future proper performance of this system. Service shall be available with a maximum 24-hour response time. The prime function of this organization shall be prompt, efficient service. Upon project completion, the equipment supplier shall present a full coverage preventive maintenance agreement to the Owner for his purchase approval covering all service and instructions to the customer, within a minimum of two (2) inspections per year with no additional charge for emergency calls between inspections during normal working hours.

3.5 GUARANTEE

- A. See general conditions.
- B. Provide any service incidental for the proper performance of the system during the guarantee period.

END OF SECTION

SECTION 31 1000
SITE CLEARING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

1.2 QUALITY ASSURANCE

- A. Clearing Firm: Company specializing in the type of work required.
 - 1. Minimum of five years of documented experience.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Fill Material: As specified in Section 31 2323 - Fill and Backfill.

PART 3 EXECUTION

3.1 SITE CLEARING

- A. Comply with site clearing recommendations in Document 00 3100 - Available Project Information: Soils Investigation.
- B. Comply with other requirements specified in Section 01 7000.
- C. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- D. Erosion Control: Comply with requirements of Section 01 5713 - Temporary Erosion and Sediment Control.

3.2 EXISTING UTILITIES AND BUILT ELEMENTS

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.

3.3 VEGETATION

- A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, turf, and planting beds.
- B. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:

1. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.
 2. Around other vegetation to remain within vegetation removal limits.
- C. In areas where vegetation must be removed but no construction will occur other than previous paving, remove vegetation with minimum disturbance of the subsoil.
- D. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
 2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 4. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
 5. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- E. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.
- F. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.4 DEBRIS

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 2200 GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Removal and storage of topsoil.
- B. Rough grading the site for building pads.
- C. Finish grading for planting.

1.2 REFERENCES

- A. New Mexico Standard Specification for Public Works Construction; 2006.

1.3 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.
- B. Submit project record documents in accordance with Section 01 7800 - Closeout Submittals.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the New Mexico Standard Specification for Public Works Construction except where amended or superseded by the construction documents.
- B. Erosion Control: Comply with requirements of Section 01 5713 - Temporary Erosion and Sediment Control.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.

3.2 PREPARATION

- A. Site Clearing: As specified in Section 31 1000 - Site Clearing.
- B. Identify required lines, levels, contours, and datum.
- C. Stake and flag locations of known utilities.
- D. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- E. Notify utility company to remove and relocate utilities.

- F. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- G. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

3.3 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil .
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. See Section 31 2323 for filling procedures.
- G. Benching Slopes: Horizontally bench existing slopes greater than 1:2 to key fill material to slope for firm bearing.
- H. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- I. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.4 SOIL REMOVAL AND STOCKPILING

- A. Stockpile topsoil to be re-used on site; remove remainder from site.
- B. Stockpile subsoil to be re-used on site; remove remainder from site.
- C. Stockpiles: Use areas designated on site; pile depth not to exceed 10 feet; protect from erosion.

3.5 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.
 - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1 inch in size. Remove soil contaminated with petroleum products.
- C. Remove debris, roots, branches, stones, in excess of 2 inch in size.
- D. Where topsoil is to be placed, scarify surface to depth of 6 inches.
- E. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches.
- F. Place topsoil where required to level finish grade.
- G. Remove roots, weeds, rocks, and foreign material while spreading.
- H. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- I. Fine grade topsoil to ensure positive drainage away from building, pavements, and site structures.

- J. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.6 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

3.7 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.8 FIELD QUALITY CONTROL

- A. See Section 31 2323 for compaction density testing.

3.9 CLEANING

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 2316 EXCAVATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Excavating for footings, slabs-on-grade, paving, site structures, and utilities within the building.
- B. Temporary excavation support and protection systems.

1.2 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

1.3 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Record drawings at project closeout according to 01 7000 - Execution and Closeout Requirements. Show locations of installed support materials left in place, including referenced locations and depths, on drawings.
- C. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Bedding and Fill to Correct Over-Excavation:
 - 1. See Section 31 2323 for bedding and corrective fill materials at general excavations.
 - 2. See Section 31 2316.13 for bedding and corrective fill materials at utility trenches.
- B. Underground Warning Tapes: As specified in Section 31 2316.13 - Trenching.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 1000 for clearing, grubbing, and removal of existing debris.
- C. See Section 31 2200 for topsoil removal.
- D. Notify utility companies to locate utilities prior to excavation.
- E. Locate, identify, and protect utilities that remain and protect from damage.

- F. Protect existing structures, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- G. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.3 TEMPORARY EXCAVATION SUPPORT AND PROTECTION

- A. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.

3.4 EXCAVATING

- A. Excavate to accommodate new structures and construction operations.
 - 1. Excavate to the specified elevations.
 - 2. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.
 - 3. See Section 31 2316.26 for required excavation clearances for pipes in utility trenches.
 - 4. Hand trim excavations. Remove loose matter.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Preparation for Piling Work: Excavate to working elevations. Coordinate special requirements for piling.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume.
- F. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.5 SUBGRADE PREPARATION

- A. See Section 31 2323 for subgrade preparation at general excavations.
- B. See Section 31 2316.13 for subgrade preparation at utility trenches.

3.6 FILLING AND BACKFILLING

- A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.
- B. See Section 31 2323 for fill, backfill, and compaction requirements at general excavations.
- C. See Section 31 2316.13 for fill, backfill, and compaction requirements at utility trenches.
- D. See Section 31 2200 for rough and final grading and topsoil replacement requirements.

3.7 REPAIR

- A. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

3.8 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.9 CLEANING

- A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 2200.
- B. Remove excavated material that is unsuitable for re-use from site.
- C. Remove excess excavated material from site.

3.10 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

SECTION 31 2316.13
TRENCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Backfilling and compacting for utilities outside the building to utility main connections.

1.2 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: Indicated on drawings.

1.3 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2018.
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012, with Editorial Revision (2015).
- C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)); 2012, with Editorial Revision (2015).
- D. New Mexico Standard Specification for Public Works Construction; 2006.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Compaction Density Test Reports.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the New Mexico Standard Specification for Public Works Construction except where amended or superseded by the construction documents.
- B. Erosion Control: Comply with requirements of Section 01 5713 - Temporary Erosion and Sediment Control.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where designated.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Fill Materials: As specified in Section 31 2323.

2.2 ACCESSORIES

- A. Underground Warning Tapes: Provide underground warning tape to identify underground electrical cables, electrical lines, fire suppression lines, plumbing lines, and HVAC lines.
 - 1. Materials: Use foil-backed detectable type polyethylene tape suitable for direct burial.
 - 2. Foil-backed Detectable Type Tapes: 6 inches wide, minimum, with minimum thickness of 5 mil, unless otherwise required for proper detection.
 - 3. Legend: Type of service, continuously repeated over full length of tape; Color code as follows:
 - a. Electrical power lines: Black text on red background.
 - b. Communication, alarm, and signal lines: Black text on orange background.
 - c. Potable water lines: Black text on blue background.
 - d. Gas lines: Black text on yellow background.
 - e. Sewer lines: Black text on green background.
 - f. Force mains: Black text on brown background.
 - g. Non-potable or reclaimed water: Black text on purple background.
 - h. Fire quenching fluids: White text on a red background.
 - i. Potable, cooling, boiler, feed, other water: Green with white letters.
 - j. Fire quenching fluids: Red with white letters.
 - k. Toxic and corrosive fluids: Orange with black letters.
 - l. Flammable fluids: Yellow with black letters.
 - m. Combustible fluids: Brown with white letters.
 - n. Compressed air: Blue with white letters.

2.3 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, testing of samples for compliance will be provided.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.3 TRENCHING

- A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- G. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard measured by volume.
- H. Remove excavated material that is unsuitable for re-use from site.
- I. Stockpile excavated material to be re-used in area designated in Section 31 2200.
- J. Remove excess excavated material from site.
- K. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- L. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.4 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with materials in accordance with in Document 00 3100 - Available Project Information: Soils Investigation.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.5 BACKFILLING

- A. Backfill to contours and elevations indicated using unfrozen materials.
- B. Fill up to finish grade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- G. Correct areas that are over-excavated.
 - 1. Thrust bearing surfaces: Fill with concrete.
 - 2. Other areas: Provide materials in accordance with in Document 00 3100 - Available Project Information: Soils Investigation.

H. Compaction Density Unless Otherwise Specified or Indicated:

1. Under paving, slabs-on-grade, foundations, and similar construction: 95 percent of maximum dry density.
2. At other locations: 90 percent of maximum dry density.

I. Reshape and re-compact fills subjected to vehicular traffic.

3.6 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Frequency of Tests: In each compacted initial and final backfill layer perform at least one field in-place density test for each 150 lineal feet or less of trench at intervals no greater than 2 feet vertical but no fewer than two tests.

3.8 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 31 2323

FILL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Filling and compacting for slabs-on-grade, paving, utilities within the building, and trenches.
- B. Backfilling and compacting for utilities outside the building to utility main connections.

1.2 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Special Inspections: Refer to Section 01 4216 - Definitions.
- C. Subgrade Elevations: Indicated on drawings.

1.3 REFERENCE STANDARDS

- A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012, with Editorial Revision (2015).
- B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)); 2012, with Editorial Revision (2015).

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Fill Composition Test Reports: Results of laboratory tests on actual materials used.
- C. Compaction Density Test Reports.

1.5 QUALITY ASSURANCE

- A. In addition to requirements specified in this Section, perform Work in accordance with Document 00 3100 - Available Project Information: Geotechnical Evaluation Report.
- B. Erosion Control: Comply with requirements of Section 01 5713 - Temporary Erosion and Sediment Control.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where directed by Owner.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Fill Materials: Comply with Document 00 3100 - Available Project Information: Geotechnical Evaluation Report.

2.2 ACCESSORIES

- A. Underground Warning Tapes: As specified in Section 31 2316.13 - Trenching.

2.3 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the Work are as indicated.
- B. Identify required lines, levels, contours, and datum locations.
- C. See Section 31 2200 for additional requirements.
- D. Verify areas to be filled are not compromised with surface or ground water.

3.2 PREPARATION

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with materials in accordance with requirements identified in Document 00 3100 - Available Project Information: Geotechnical Evaluation Report.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.3 FILLING

- A. Place fill and backfill in accordance with requirements identified in Document 00 3100 - Available Project Information: Geotechnical Evaluation Report.
- B. Fill to contours and elevations indicated using unfrozen materials.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials, as recommended by Geotechnical Evaluation Report, to attain required compaction density.
- F. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

- G. Correct areas that are over-excavated.
- H. Provide fill materials in accordance with requirements identified in Document 00 3100 - Available Project Information: Geotechnical Evaluation Report.
- I. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Provide compaction density in accordance with requirements identified in Document 00 3100 - Available Project Information: Geotechnical Evaluation Report.
- J. Provide detectable tape above utilities in trenches in accordance with Section 31 2316 - Excavation.
- K. Reshape and re-compact fills subjected to vehicular traffic.
- L. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- M. Erosion Control: As specified in Section 01 5713 - Temporary Erosion and Sediment Control.

3.4 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor") or ASTM D1557 ("modified Proctor").
- C. Observation and field tests shall be carried on during fill and backfill placement by Special Inspections to assist the Contractor in obtaining the required degree of compaction. If tests indicate less than required compaction, additional compaction effort shall be made, as approved by Special Inspections, until required compaction is obtained.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- E. Frequency of Tests:
 - 1. Fill and Backfill: Perform at least one test of each compacted soil stratum to verify design bearing capacities. Subsequent verification and approval of other subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Architect.
 - a. Building Slab Areas: At subgrade and at each compacted fill and backfill lift, perform at least one field in-place density test for every 2,500 sq. ft. or less of building slab.
 - b. Building Footing Subgrade: At subgrade and at each compacted fill and backfill lift, perform at least one field in-place density test for each 50 lineal feet.
 - c. Utility Trenches Inside the Building: At subgrade and each compacted initial and final backfill lift perform at least one field in-place density test for each 50 lineal feet or less of trench at intervals no greater than 12 inches vertical, but no fewer than two tests.
 - d. Utility Trenches Outside the Building: As specified in Section 31 2316.13 - Trenching

3.6 CLEANING

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 32 3136
SECURITY GATES AND BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Security gates and barriers.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Security Gates and Barriers:
 - 1. Lazy JV Ranch Equipment Sales.

2.2 SECURITY GATES AND BARRIERS

- A. Security Gates and Barriers: Factory-fabricated, -assembled, and -tested devices, including components for satisfactory operation; capable of resisting specified impact when installed in foundations indicated on drawings.
- B. Material: Hot-dipped galvanized steel with painted finish.
- C. Color: As selected from manufacturer's standard.

2.3 NON-AUTOMATED BARRIERS

- A. Horizontal Swing Gates: Manually operated, structural steel crash barrier swing gate; gate arm rotating in direction of travel; supported by high impact end posts; closed position secured by hydraulic pin.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 - 1. Verify location of existing utilities, grades and conditions of substrate.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

3.3 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.

3.4 PROTECTION

- A. Protect installed units from subsequent construction operations.

END OF SECTION